PUBLISHED MONTHLY
FOUNDED IN 1905

EXCAVATING ENGINEER

DEVOTED EXCLUSIVELY
TO EXCAVATION

About Excavating Projects — By Excavating Men — For Excavating Men — The World Over

Vol. 28 OCTOBER, 1934 No. 10

Contents

Stripping Anthracite Coal ..... **Front Cover**
A scene in Pennsylvania showing the amount of overburden that must be removed to uncover the coal.

Frontispiece **454**
Methods used in 1871 to construct a ship channel between Long Island Sound and East River.

Speedy Drilling on Sheppton Mountain, by D. W. Evans **455**
A Bucyrus-Armstrong No. 29 blast hole drill on Brown Excavating Company's stripping job puts down 63,000 feet in 18 months.

New Type Primer Increases Blasting Safety, by John R. Marcy **458**
The construction force of the Metropolitan Water District of Southern California, working on the Colorado River Aqueduct, has devised a new type primer that greatly decreases blasting hazards.

Mining Operations Near Hell Gate **459**

Lock No. 9, Another Link in the Series of Locks in the Mississippi ... **460**
Methods used by Walter W. Magee Company in building the lock at Lynxville, Wisconsin.

Old Times & Old Timers **465**

A railroad job in Indiana is described by Old Timer C. A. Sears 465
Old Timer J. A. Barnard tells us more about the Fairbanks back digger 465
Construction work in the '70's as related by Old Timer H. B. Whitney 465

Help, Old Timers! **465**

Editorial **466**

The Business Situation 466

Field Notes **468**

Water Tank Lowered 20 Feet 468
Unforeseen Rock Conditions 468
Good Guard for Rope 468

Equipment You Ought to Know About **469**

New Lightweight Drifter 469
New Waterproof Bag 469
Two New Types of Air Hose Announced 469
New Portable Floodlight System 469

Shots from the Firing Line **470**

Six Companies Awarded Parker Dam 470
Hardwick and McGlone Low Bidders Fort Peck Spillway 470
Major Philip B. Fleming Named Deputy PWA Administrator 470
Progress on Public Works Highways to September 22, 1934 470
Canada—Ontario Notes 470
New York Notes 470
New Jersey Notes 471
Delaware Notes 471
Pennsylvania Notes 471
Maryland Notes 471
Georgia Notes 471
Ohio Notes 471
Tennessee Notes 472
Mississippi Notes 472
Wisconsin Notes 472
St. Louis and Vicinity 474
River Notes 474
Missouri Notes 476
Arkansas Notes 476
Texas Notes 476
Minnesota Notes 478
Fort Peck Dam Notes 478
South Dakota Notes 480
Oregon Notes 480
Washington Notes 480
Grand Coulee Dam Notes 480
Utah Notes 480
New Mexico Notes 482
Arizona Notes 482
Nevada Notes 484
Colorado River Aqueduct Notes 484
California Notes 485
Southern California Notes 485

Book Reviews **488**

Trade Notes **489**

Looking Ahead

These interesting articles will appear in early issues of Excavating Engineer. Watch for them!

Building Levees with the Chamber's Bridge.
Lewis-Chambers Company, Inc., use something new and different in dirt moving equipment on levee work.

Building San Gabriel Dam No. 1.
The construction of this huge rock fill dam presents many interesting features. West Slope Construction Company is the contractor on this $8,000,000 project.

The Walker Invades the Coal Fields.
Carey Baxter & Kennedy use walking Diesel dragline successfully on 3,000,000 yard stripping contract in Pennsylvania.

Published Monthly by **THE EXCAVATING ENGINEER PUBLISHING COMPANY, South Milwaukee, Wisconsin, U.S.A.**

F. O. WYSE
Managing Editor

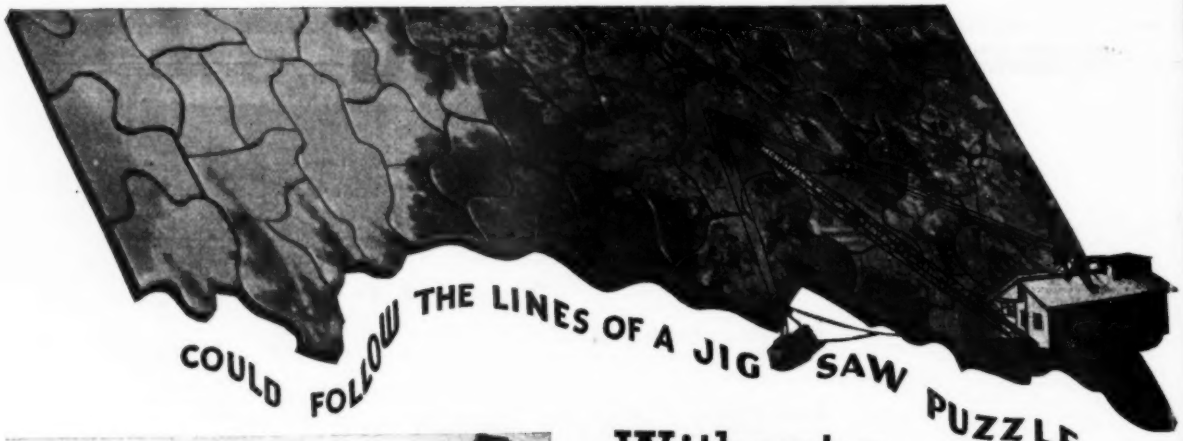
ARNOLD ANDREWS
Editor

Regular subscription: $1.00 a year; Canada and foreign, $2.00 per year. Special subscription: Upon application on card inserted in this number, this publication will be sent frequently (not regularly) free of charge, to companies, executives and supervisors engaged actively in the industry of excavation.

E. M. HEUSTON
Advertising Manager

E. T. OBENCHAIN
Assistant Editor

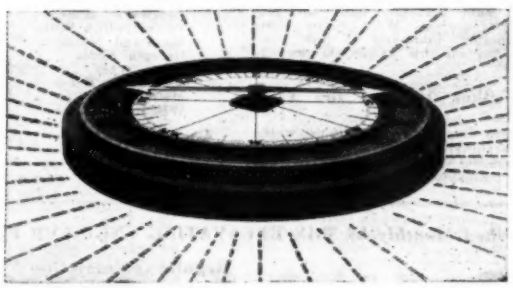
COPYRIGHT 1934 BY THE EXCAVATING ENGINEER PUBLISHING COMPANY



Without a Single Lost Motion!

No matter how tortuous the path, the Bucyrus - Monighan Walking Dragline Excavator can follow it. Direction of travel is changed by simply swinging the revolving frame and pointing the walking shoes in the desired direction. The Walker sidesteps or zig-zags its way around obstacles such as trees, boulders and holes—without wasting time or distance. The Walker pivots on its large circular base, then steps off in any direction.

This exclusive method of steering and moving is one of the features which make it possible to operate the Bucyrus - Monighan Walker in the most confined or narrow spaces. Bucyrus - Monighan Company, Chicago, Illinois.



The separate circular Base. An exclusive Bucyrus - Monighan feature.

B-54

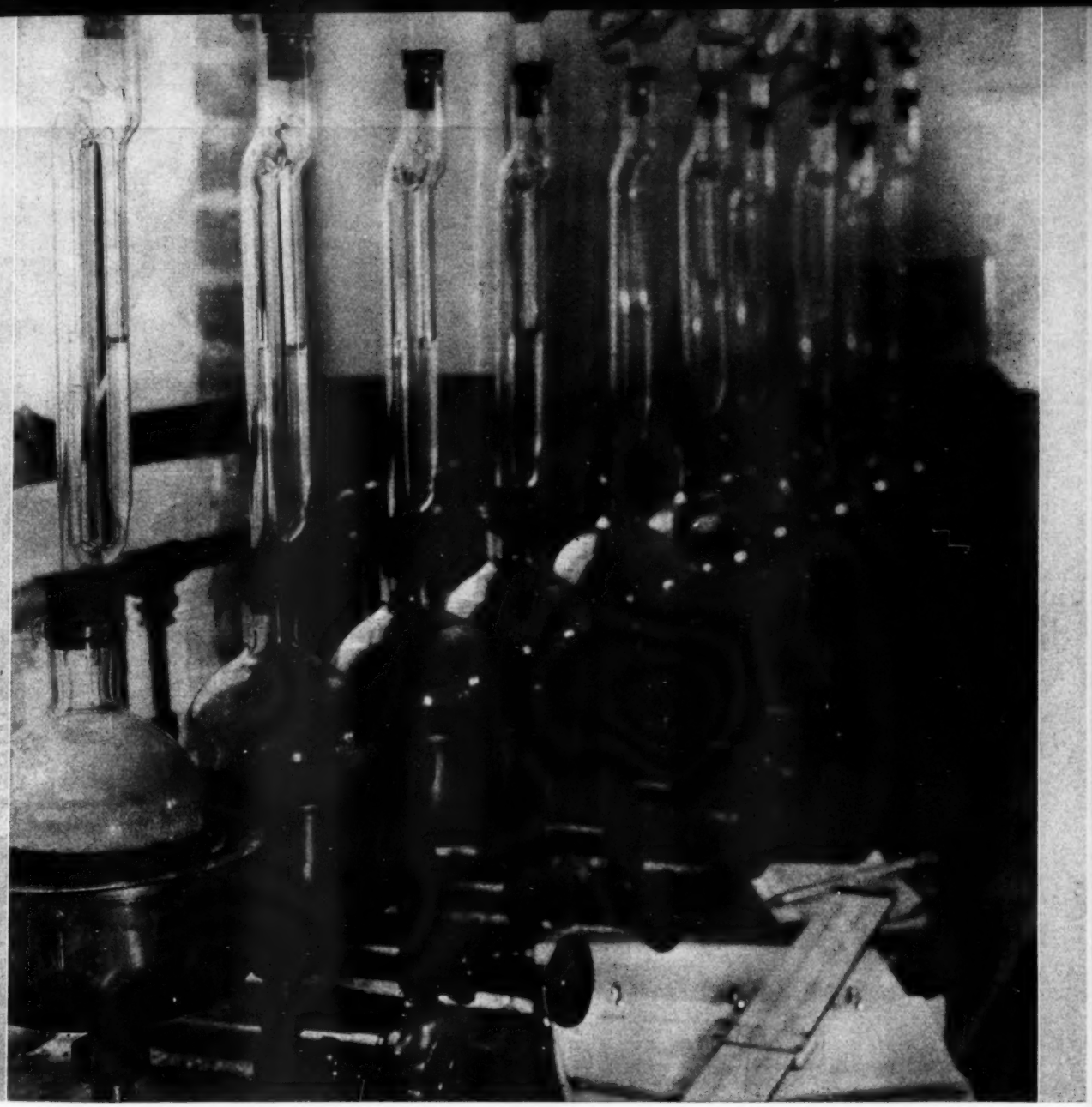
BUCYRUS MONIGHAN

Walking Draglines 1 to 10 cubic yards

Sold by **BUCYRUS-ERIE COMPANY**
South Milwaukee, Wis.

Representatives throughout the U. S. A. Branch Offices: Boston, New York, Philadelphia, Birmingham, Pittsburgh, Chicago, St. Louis, Kansas City, Dallas, San Francisco. Offices or Distributors throughout the world.

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.



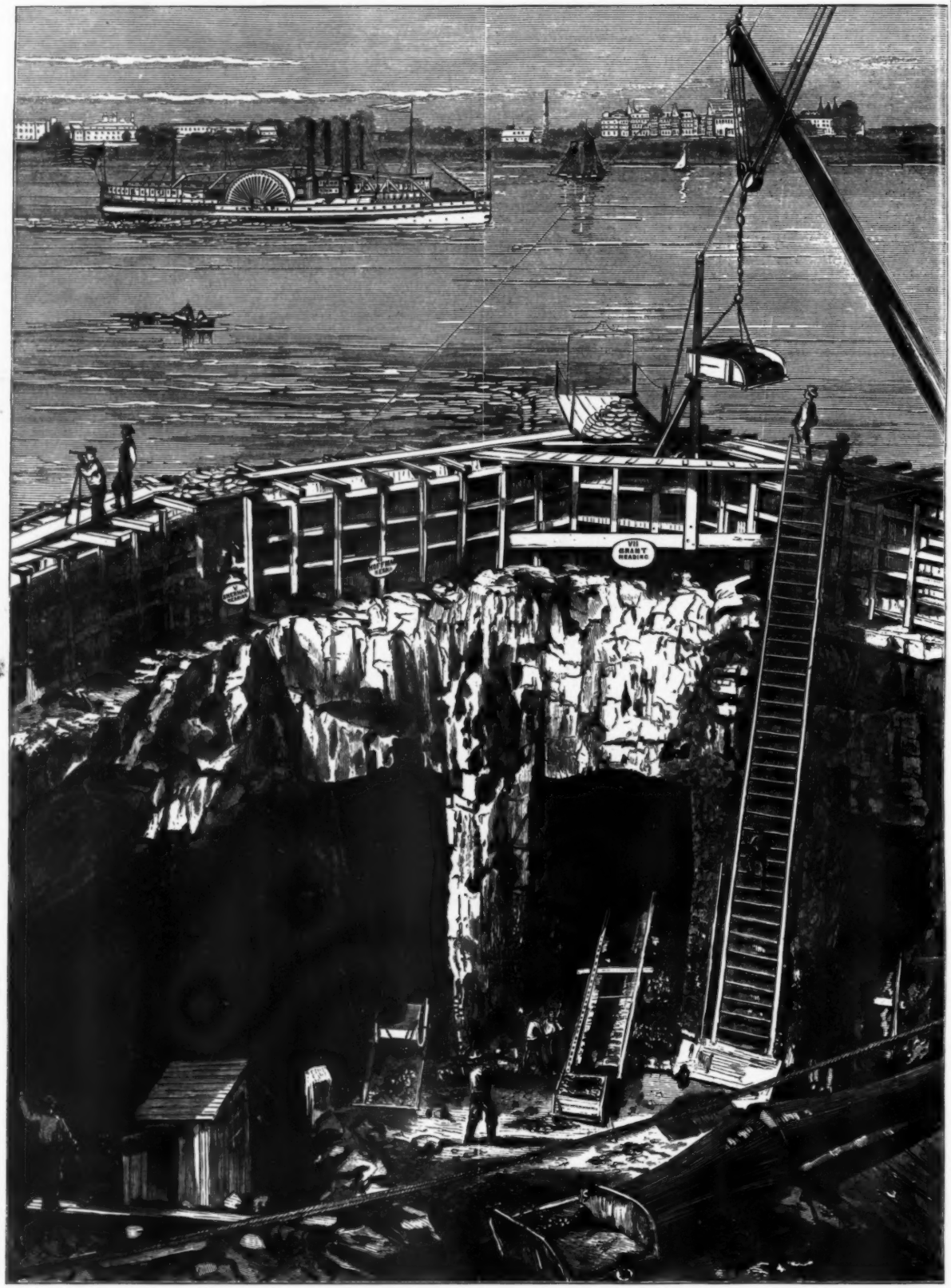
R. Wood

ONTROL HERE MEANS CONTROL IN THE FIELD

The apparatus shown above is a final check in a system of chemical control which makes certain that Hercules explosives do not contain excess moisture—a condition which may jeopardize good blasting results. ☆☆☆ This procedure is not new in principle, but Hercules refinements have made it infallible for accurately determining moisture. ☆☆☆ Dynamite that does not conform strictly to the narrow limits of this type of chemical control is not shipped from Hercules plants. That is one reason why our explosives have won an enviable reputation for reliability and uniformity in the field.

HERCULES POWDER COMPANY
INCORPORATED
972 King Street, Wilmington, Delaware

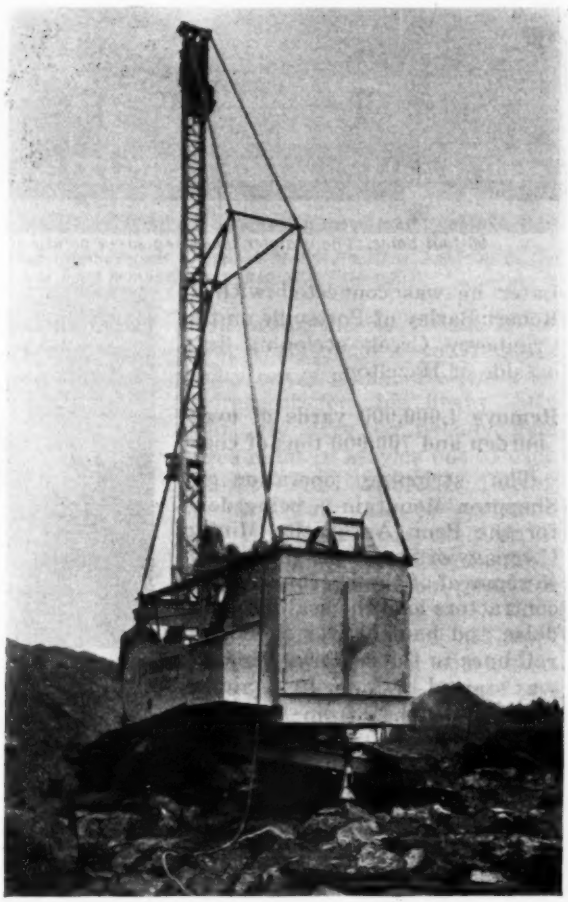
GH EXPLOSIVES • • PERMISSIBLES • • BLASTING POWDERS • • DETONATORS • • BLASTING SUPPLIES



Submarine Mining Operations near Hell Gate in 1871—see story on page 459

EXCAVATING ENGINEER
FOUNDED 1905

OCTOBER, 1934
VOL. XXVIII NO. 10



A Bucyrus - Armstrong drill, on uneven footing at work in the anthracite field. With its three-point suspension and pivoting axle the machine remains level.

Speedy Drilling on Sheppton Mountain

Brown Excavating Company, on anthracite stripping project in Pennsylvania, puts down 63,000 feet of 6-inch hole in eighteen months with Bucyrus-Armstrong blast hole drill.

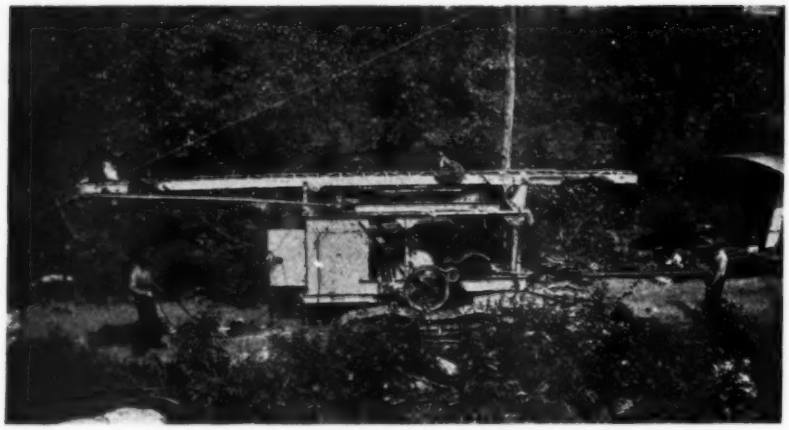
By D. W. EVANS

THE PEAK of Mount Everest, in India, highest point of land on this globe, rises 29,000 feet above sea level. Out in the Pacific Ocean, off Japan, is a hole 30,000 feet deep. From the highest to the lowest point in the world is therefore a distance of just under 60,000 feet.

During the past eighteen months, Brown Excavating Company using a Bucyrus-Armstrong No. 29 blast hole drill has churned a total footage of 63,000 feet of 6-inch hole through hard sandstone. A distance greater than the heighth from the tip of Mount Everest to the bottom of the deepest hole in the Pacific!

The crest of modest Sheppton Mountain, five miles north of Mahanoy City in the anthracite region of Eastern Pennsylvania, is only 1,600 feet above sea level. Here, this organization, Brown Excavating Company of Shenandoah, has been handling a coal stripping job for over two years. The job consists primarily in removing the overburden from a basin of Primrose Vein anthracite, the basin running along the ridge for about three-quarters of a mile, with a width of approximately 200 feet. In addition, coal will be recovered from three local pockets now proved, and some additional recovery may be undertaken if prospect drilling now in progress shows stripping to be justified economically.

Brown Excavating Company was incorporated in 1928 to handle a job of anthracite stripping at Gowen, Pennsylvania, for the Buck Mountain Coal Company. This job, incidentally, is still in progress. Patrick Brown is President of the Brown Excavating Company, the other officers being A. F. Canfield, Vice-President, and J. V. Tierney, Secretary-Treasurer. Prior to formation of the concern Mr. Brown had charge of all drilling operations for the Dottson interests on an extensive coal stripping project at Lansford.



Mike Walko at the levers of the new No. 29 is walking it up the line to drill some 90-foot holes. The crawler mounting saves plenty of time on moving.

Later he was connected with J. Robert Bazley of Pottsville on the Cranberry Creek stripping just outside of Hazelton.

Remove 4,000,000 yards of overburden and 700,000 tons of coal

The stripping operation at Sheppton Mountain is being done for the Penn Anthracite Mining Company of Scranton. In addition to removal of the overburden, the contractors load the coal into gondolas and haul it over their own rail lines to the colliery. This job was started in June, 1932, and at present still has from 8 months to a year's work to be done before completion. Quantities involved include roughly 4,000,000 cubic yards of overburden and the recovery of some 700,000 tons of Primrose Vein Anthracite. As is usual on stripping jobs in the anthracite region the overburden is largely rock, with some clay topsoil. In sinking the holes for the blasting necessary to break up this rock the Bucyrus-Armstrong drill has achieved its remarkable record of 63,000 feet of 6-inch hole in eighteen months.

Drill operates 24 hours a day

When the job was started in 1932, drilling operations were carried on with an old electric drill of a well-known make, mounted on traction wheels. In February, 1933, the Bucyrus-Armstrong No. 29 electric was placed in operation, and both machines have been used since with the No. 29 working 24 hours a day up to August,

This heavy-duty wagon which carries the power transformers helps to make moving easy.

1934. Since that date this drill has operated only two shifts, as it has passed the sandstone formation and encountered shale. One drill crew was transferred to a gasoline-powered rig, to put down prospect holes over an unproved section of the job.

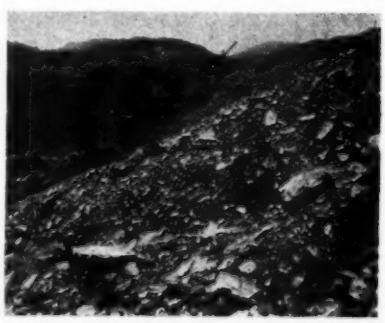
According to Adam Wolfkeil, driller, and his helper, Jean McCoy, who ran the No. 1 shift on the new drill, it was evident from the first that the Bucyrus-Armstrong could put down more hole than the older machine, because it handled a heavier string of tools, although both machines used 6-inch bits. The biggest advantage possessed by the modern rig, however, was its full crawler mounting, which materially reduced the time required for moves between holes. Mike Walko and Matt Grenavich on the wheel-mounted machine, would average around 60 feet of hole in an 8-hour shift, while the Bucyrus-Armstrong machine consistently put down 80 feet per shift, and in good going sometimes ran up as high as 120 feet, drilling twice as much as the lighter machine.

Modern drill has many advantages

According to Mr. Wolfkeil, this modern drill has many advantages over the older machine. In addition to the crawler mounting, and the greater capacity of the drill; the simplicity of operation, requiring only one-third as many levers, is a big improvement. Furthermore, the steel cable, the use of which is made possible by the rubber shock absorbers below the crown sheave, lasts about five times as long as a manila rope. Another advantage of the Bucyrus-Armstrong drill, as compared with other modern drills, is that the operating platform is located only two feet from the ground, so that handling of tools is easier, and it is no trouble at all to get on and off the platform.

As stated before, this basin containing Primrose Vein anthracite, is very narrow, being only 200 feet wide on the average between outcrops. The drills put down their holes on 14-foot centers throughout the job, depth of hole varying from 40 to 70 feet. With this spacing a row of from 10 to 15 holes are put down across the basin. Three rows are shot at one time.

In general, most of the material encountered has been a hard sandstone, which, together with good planning of the work, account for the remarkable footage drilled on



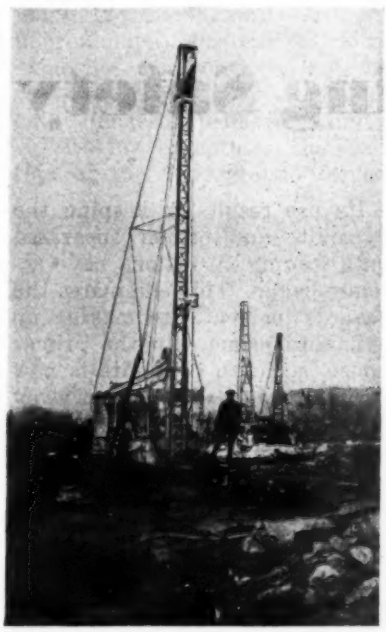
General view of the big ditch on top of Sheppton Mountain. In the distance at the end of the cut one of the two big draglines may be seen.

this job. The only delays encountered were due to difficulties with the clay topsoil. No liners were used in any of the holes, and the presence of the clay at times slowed up drill operations.

Obtain good rock breakage using a pound of dynamite per yard of rock

Excavation on this job, as explained in more detail later, is handled entirely by draglines. On this account, the drill holes were loaded as heavily as possible for maximum breakage of the rock. Wherever possible holes were sprung. From 400 to 500 pounds of 4½"x16" Atlas 40% quarry gelatin cartridges were loaded into each 70-foot hole up to within 30 feet of ground level, no dynamite being used above this point.

Cordeau - Bickford detonating fuse has been used exclusively on the firing. A length of Cordeau is inserted into each hole before loading, leaving a few feet sticking out of the top of the hole. Each length is spliced to the Cordeau header, all holes being set off at one time. The average blast, firing 30 to 45 holes, sets off 7 to 8 tons of gelatin. Such a shot usually broke up around 12,000 yards of rock for the draglines.



In hard sandstone this heavy-duty No. 29 drill puts down from 80 to 120 feet per shift.

Shops of Brown Excavating Company on Sheppton Mountain. The box car in the foreground has been remodeled for use as a field office.

Usual working conditions called for the drills to operate eight days straight, and then stand by on the next day for a blast.

Prospect drill encounters hard rock

Two months before our visit to this project, as the drills approached the western end of the basin, the sandstone changed to a shale, so the Bucyrus-Armstrong was cut down to two shifts per day, still easily keeping ahead of the draglines. At this time a light gasoline-powered drill was brought in from the Gowen job to do prospect drilling. In addition to the main basin, where the coal runs from 14 to 27 feet in thickness, three local pockets were known to exist, two of them half a mile west of the main basin. The prospect rig at the time of our visit was putting down test holes in the area between the draglines and these two pockets. It was found that the vein ran through this area, but was so thin as to make it unprofitable to recover.

10,000 feet of hole per drill cable

Adam Wolfkeil and Jean McCoy were transferred to the gas rig from the Bucyrus - Armstrong drill. They encountered a hard conglomerate rock which was plenty tough for this light rig, and often could drill only 6 to 8 feet in a shift. Mr. Wolfkeil wished fervently that the power lines were close enough so he could bring the No. 29 out to see what this machine could do in really heavy going. He has a lot of respect for this heavy duty drill. He says he usually gets three months' service out of each 150-foot steel drill-line. During the first full year of operation four drill-lines were used up in sinking 42,657 feet of hole. This means each rope was good for around 10,000 feet of hole.

The excavation on this Sheppton Mountain project consists in effect in digging a big "ditch" 200 feet wide. To handle this two Marion Type 125 electric draglines are used, standing on each side of the ditch, working in tandem and casting the material to each side. Because the mountain slopes sharply away from the south side of the cut there is more room for disposal and the dragline on this side consequently is worked 3 shifts to one for the other machine.

The coal is drilled with an Ingersoll-Rand X-70 drill, and then is shaken up with black powder to make digging easier. A Marion Type 450 electric shovel loads the coal into gondolas hauled by a locomotive leased from the Lehigh Valley Railroad. The locomotive hauls the coal up two switchbacks to the very top of the mountain where the office and shops are located.

Sharpener does good work

In the blacksmith shop is a Bucyrus-Armstrong No. 8 electric

This gasoline powered prospect drill is in hard conglomerate rock. Operator Wolfkeil wishes he could get the Bucyrus-Armstrong drill out here to see how it performs in tough going.

drill bit sharpener, and forge, and an Ingersoll-Rand pneumatic sharpener for the jackhammer bits. We learn from Ray Brown that the blacksmith not only operates both sharpeners but in addition takes care of such jobs as the rebuilding of dragline buckets, and in his spare time helps the mechanic overhauling some trucks. The sandstone encountered on this job does not present any great problem in drill sharpening. The conventional chisel-shaped bit is used on the blast hole drills. The sharpener turned out a dozen or more perfectly dressed bits every day. No serious mechanical trouble with the sharpener has been experienced.

Down below the second switchback where the loaded coal cars are spotted before hauling out over the main "loky" road, the two electric drills are being moved into position for drilling at one of the three local coal pockets. This pocket is more than a quarter of a mile from the draglines, and as the rigs carry only 1,000 feet of cable three changes are necessary in the hook-up to the power line. A handy wrinkle in moving is the use of an all-steel Conestoga dump wagon which carries the power transformers. It is easily moved, 1,000 feet at a shift, nearer the pocket and parked beside the nearest pole, where a connection is made to the power line. At this coal pocket the Bucyrus-Armstrong will encounter the deepest drilling on the job, as the coal lies 90 feet below the surface.

Adam Wolfkeil says the No. 29 blast hole drill is the best he has seen.

Since there is no power line down to the prospect rig, drilling through the conglomerate, it looks as though Adam Wolfkeil won't have a chance, on this job at least, of seeing what this modern Bucyrus-Armstrong drill can do in what he considers tough going.

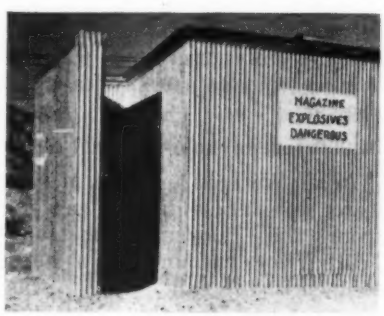
We wish to acknowledge indebtedness to Foreman Bert Brown, and Office Manager Ray Brown, for data used in preparation of this article.

New Type Primer Increases Blasting Safety

By **JOHN R. MARCY**

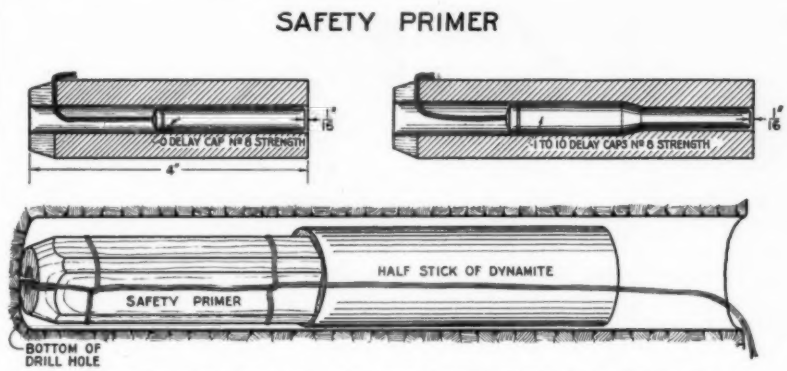
METROPOLITAN Water District construction forces have adopted the use of a new safety primer in all blasting operations on the Coachella Division of the Colorado River Aqueduct. A number of the contractors, working on other divisions of the Aqueduct where the work is being done by contract, have also found the new safety primer possessing advantages over the old type of dynamite primer.

This new safety primer consists of a wooden plug through which a hole has been bored lengthwise, and in which an electric blasting cap has been inserted and glued in place, as shown in the drawing on p. 459.



A typical powder house in use on the aqueduct. Substantially built and covered with aluminum paint which reduces the interior temperature, the entrance is protected by a bullet-proof doorguard.

Its use results in keeping the dynamite and primer separated until loading operations have actually begun. This eliminates the hazards incidental to making up dynamite primers in the primer house, since no dynamite is now permitted there. It also does away with the dangers such as are present with the old type in transporting primers to the headings, and in further handling through to the completed loading. Moreover, unexploded primers in muck piles present little or no hazard when struck by a shovel tooth or any other tool, because of the protection afforded by the wood covering.


SAFETY PRIMER
1" TO 10 DELAY CAPS Nº 6 STRENGTH
4"
1" TO 10 DELAY CAPS Nº 6 STRENGTH
HALF STICK OF DYNAMITE
SAFETY PRIMER
BOTTOM OF DRILL HOLE
Note: When used in hard rock, with rounds in excess of 10 feet, the best results are obtained by placing ½ stick of 60% powder in the bottom of hole followed by the safety primer and a primer stick of 60% powder.

These sketches show cross-sections of the primers and their application in setting off charges.

The wooden primer plugs are inexpensive, especially when made up in quantity, and are easier and quicker to prepare than the dynamite type.

Extensive tests conducted by T. W. Osgood, Safety Engineer, and H. E. Munn, Assistant Safety Engineer of the District, showed that the safety primers pull rounds as efficiently as the conventional dynamite type. In addition there was no noticeable increase in the amount of blasting gases present at the time men returned to the tunnel headings.

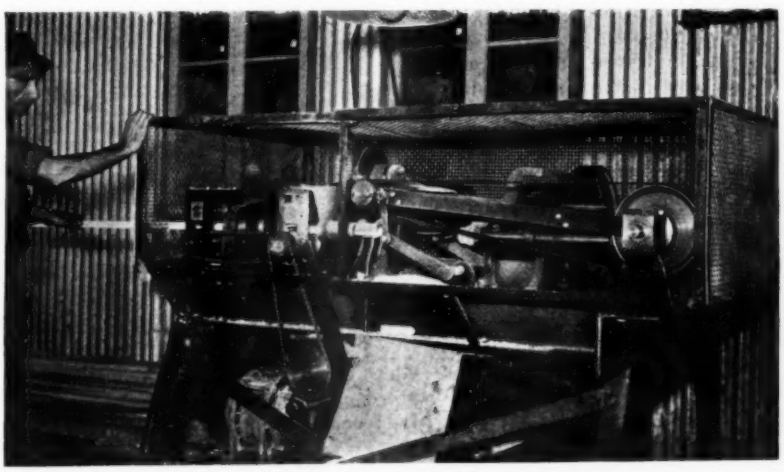
The tests further indicated that, in tunnels which had been using 12-inch dynamite primers, approximately one-half stick of explosive was saved per hole by the use of safety primers with only 6 inches of primer dynamite.

With few exceptions, the reaction of the underground forces, both men and foremen, has been favorable to the use of the new primer.

An automatic machine for the manufacture of the wooden primer plugs has been built in the Coachella Division machine shops under the direction of Charles Barber, shop foreman. This machine is highly efficient, manufacturing the plugs at the rate of 4500 per 8-hour shift.

More than 100,000 safety primers have been fired from the date of their first use on the Aqueduct up to now, with uniformly good results. The present consumption is approximately 2000 per day.

While safety primers have been used heretofore in mines, their adoption by the Colorado Aqueduct forces marks the first time that such a device has been used extensively in tunneling operations.



This automatic machine, designed and built by the District's forces, turns out 4500 primers in eight hours.

Mining Operations Near Hell Gate

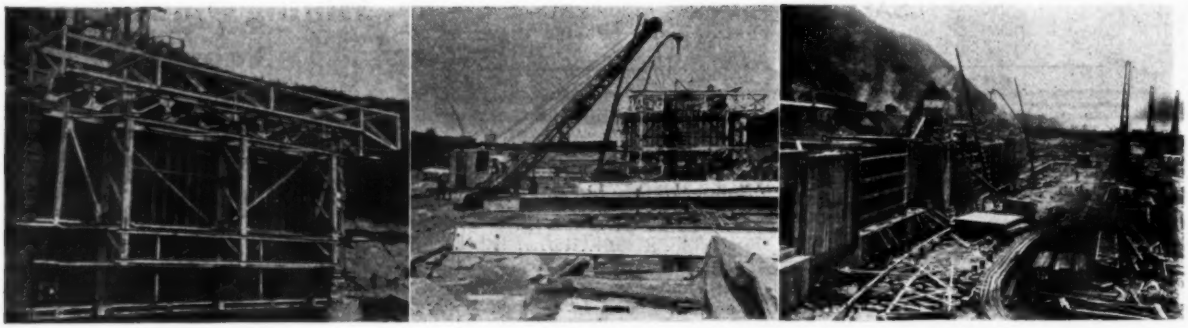
THE FRONTISPIECE illustration is reproduced from the September 23, 1871, issue of Harper's Weekly which describes the work shown in the drawing. In 1869 the Federal government proceeded to construct a navigable channel between East River and Long Island Sound near Hallet's Point (Hell Gate).

The work, under the direction of General John Newton, involved the solution of an important engineering problem to determine the most economical and effective process of submarine blasting. A device designed at that time for drilling rock under water consisted of a water-tight iron casing, semi-spherical in shape, resting on three steel legs. This chamber contained two horizontal steam engines, working at right angles to each other, driving the drill bar through differential gearing, advancing the drill into the rock. The drill bar had a bit 1½ inches in diameter with 19 diamonds in its face. The bar was turned at a rate of 300 to 500 revolutions per minute with a feed of about 1½ inches in the same time. After a number of holes had been drilled, a diver placed the charges and the blast set off. The broken pieces were raised by automatic grapnels.

The illustration shows another method used by General Newton. A cofferdam, approximately 100 feet in diameter, was built out in the future channel.

After dewatering, excavation was carried down to a depth of 34 feet in the rock below low water. From the bottom of the shaft ten tunnels extended radially from 175 to 300 feet in length with cross connecting tunnels every 25 feet. The tunnels varied in cross section depending on rock conditions.

The theory behind this plan contemplated removing as much rock as was possible with safety, then blasting out the dividing walls, the result of which would allow the rock roof to settle into the deep pits, thus creating a channel of the desired depth.



Left: Movable Blaw-Knox steel forms aid materially in maintaining good progress in concrete pouring at Lock No. 9. The entire form rests on wheels and is pulled forward by means of a Bucyrus-Erie crane shown in the center. Right: A portion of the landwall and the lock floor.

Lock No. 9, Another Link in the Series of Locks in the Mississippi

Walter W. Magee Company, working at Lynxville, Wisconsin, are making good progress on their 85,000-yard concrete lock-job.

AS TOLD IN a previous issue of *Excavating Engineer*, the Federal project of making a 9-foot channel in the upper Mississippi involves the building of twenty-six locks and dams at a total cost of approximately $100,000,000.

While this program had been under consideration for a number of years, it was not until the recent period of wide-spread unemployment that it has been pushed vigorously. Money has been allotted through P.W.A. agencies. The work is in full swing under the direction of the U. S. Engineers of the War Department. The locks and dams are being built in the section of the river above St. Louis and reaching to the Twin Cities. The locations were determined by surveys made by the Engineers.

In general the practice has been to build the main and auxiliary locks first and then construct the dam completing the project. At several locations, the entire dam and lock projects are finished, ready for operation; at the remainder of the locations the locks are under construction, and bids are scheduled to be received within the next month or so for the remainder of the dams.

While the size of the dam varies according to conditions prevailing at each location, the locks, in general, are alike. The main lock is of such dimensions as to give a clear space of 600 by 110 feet between gates and walls. An auxiliary lock of somewhat similar dimensions is provided for but only partially constructed under the lock contract. A portion of the outer wall and the head gates are built with the main lock. The remainder of the auxiliary lock can be built at any time when river traffic demands it, without disturbing the dam or changing the main lock. With the upper portion of the auxiliary lock wall in place the dam wall can be built from there on.

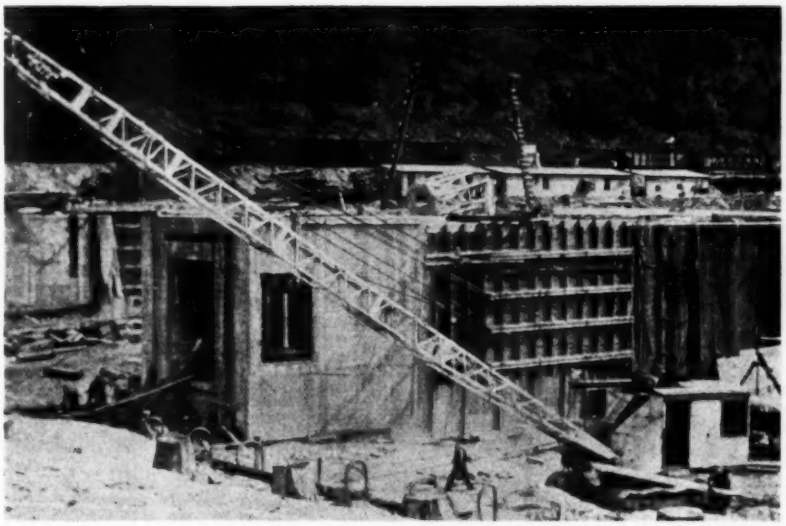
W. W. Magee Company successful bidders on Lock No. 9

Bids on Lock No. 9, located a short distance down river from Lynxville, Wisconsin, were received in October, 1933. The successful bidder was found to be the W. W. Magee Company of St. Paul, a well known construction company with many years experience on heavy concrete work and highway and bridge construction. The bid price was $1,558,280. The award was made in November and the Magee Company proceeded to get under way.

Equipment was shipped to Lynxville and on January 21 work started to prepare the site for actual construction. First of all, a 44,000-yard fill was built alongside the Chicago, Burlington and Quincy Railroad tracks which closely paralleled the river at this point. A Bucyrus-Erie Gas+Air

Storage bins under the spur tracks, holding 32 carloads, enable cars to be emptied quickly. Four classes of aggregate are used here. A 24-inch belt in front of the bins conveys the sand or gravel to the bucket elevator at the rear which feeds into the Butler bin.

shovel loaded the dirt and rock in trucks at a nearby bank of waste material. After the fill was completed, a double-track siding, 2,200 feet long with storage capacity for 44 cars, was constructed on it. In addition, an office and complete set of shops were built. A short distance from the job, a camp was established. This consists of bunk houses, mess hall and bath houses. While the Magee Company built and owns the camp, it is operated by a subcontractor. The camp has a capacity of 275 men and provides comfortable quarters and good meals at reasonable prices for them. The balance of the men employed here live near enough so that they can stay at home.



This Bucyrus-Erie 37-B crane with a 75-foot boom shifts forms and helps out wherever necessary.

Cofferdam largest on river

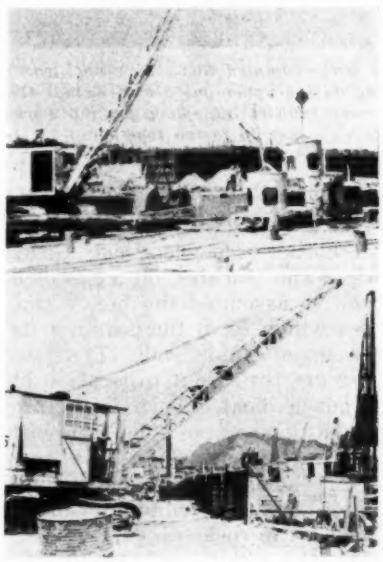
Under the direction of J. W. Kelsey, general manager, J. I. McCormick, general superintendent, James Waugh, field superintendent, and R. E. Martin, engineer in charge, the site was soon in shape so that the cofferdam could be built.

Driving the cofferdam walls started on March 4 and was completed in six weeks. The outside cofferdam wall was formed by driving Bethlehem steel sheet piling, section AP3, 19⅝" wide by 45 feet long. Approximately 1100 tons were used to enclose an area 1024 feet long by 450 feet wide, of approximately 12 acres, forming the largest cofferdam on the upper river. The inside row of piling is formed of wood timbers 4x12-inch x 24 feet long. The steel piling was driven by a barge mounted, steam, pile driver, using a McKiernan-Terry No. 7B hammer.

The area within the wall was then dredged to grade by means of a barge-mounted 12" Morris pump electrically driven. Approximately 64,300 yards of material were removed in this manner and used for fill between the inner and outer walls. The dredging operation required five weeks time for completion. No delay was experienced from high water during the flood period occurring during the month of April as the water at its highest stage did not reach the top of the piles.

After dredging was completed May 13, four 8-inch LaBour pumps driven by General Electric motors and three 10-inch pumps, Worthington, Jaeger and Aurora, driven by Westinghouse and G. E. motors, pumped 57,000,000 gallons of water out of the cofferdam in five days.

With the area within the cofferdam in shape to begin work, Superintendent McCormick started driving the piles to form supports for the walls. Like other lock-jobs on the river, all concrete work rests on piles driven to sufficient depth to give good bearing.



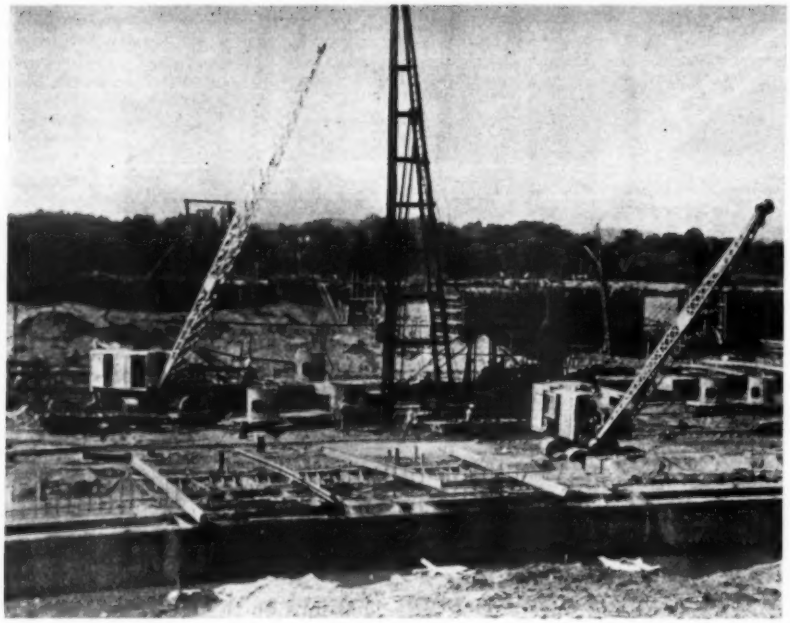
Top: A 2-yard concrete bucket being lifted into position for pouring a footing. Bottom: Digging out muck with a clamshell machine from around the piles prior to pouring a footing section.

10,214 piles form support for lock walls

The general layout for lock No. 9 is similar to lock No. 8 previously described in *Excavating Engineer*. Three massive concrete walls, with gates and appurtenances form the main and auxiliary locks.

The wall nearest the east bank of the river, known as the land wall, is about 100 feet out from the original water line. The main portion of the land wall is 915 feet long, 41 feet high, by 27½ feet wide. At the upstream end is a guide wall 521 feet long, 36 feet high, 20 feet wide. Another guide wall 504 feet long, of the same cross section, is attached to the downstream end of the land wall.

An intermediate wall of the same size as the land wall is placed far enough out in the river to give 110 feet between walls. At the same distance farther out is the third wall, but only 278½ feet of it will be constructed under this contract. The upstream gate will be installed now. Later on, when traffic justifies the addition, the third wall can be completed to its required length, the downstream gate installed, and the auxiliary lock will be completed ready for service.



The Osgood crane at the left handles the concrete buckets hauled on the industrial tracks; in the right foreground a Bucyrus-Erie Gas+Air crane places panel forms.

The three walls rest on wood piling, driven to an average depth of 34 feet. In all 10,214 piles were placed by steam pile drivers, mounted on skids and rollers, using Vulcan hammers. Each wall rests on 10 rows of wood piling. In addition a single row of steel sheet-piling is driven to act as a cut-off wall preventing undermining by the water during periods of high velocity. In the floor of the main lock, between the land and intermediate walls, piles are also driven to support the 20 concrete struts, 5x5x110 feet, which brace the entire structure.

A barge-mounted Gas+Air crane, working on the upper guide wall swings the heavy timbers into place for the workmen to fasten together.

85,000 yards of concrete required

The entire project will require approximately 85,000 yards of concrete, in addition to 465 tons of reinforcement bars and 884 tons of structural steel. After the piling was in place, either wood panel forms or Blaw-Knox steel footing forms were placed for the first layer of concrete, the footing. These heavy panel forms are moved and put into place by two Bucyrus-Erie cranes, one a Type 37-B with 75-foot boom, the other a Gas+Air with 50-foot boom. The machines move from one place to another as needed and are very popular with the Magee organization because of their versatility and dependability.

Another Bucyrus-Erie Gas+Air crane working on a barge is used to assemble the heavy timbers which form the cribbing for the upper guide wall. The timbers are towed out to location by a power boat. Here the crane places them in position. Men with electric augers, bore the necessary holes for the husky bolts. Later on the cribbing will be filled with rock which, together with the piling, will anchor the wall firmly in the river bed. When the rock fill is brought up to water level, the concrete guide wall will be constructed on it.

The first layer of concrete in the walls is 7 feet high by 32 feet wide and is poured in sections 40 feet long. The middle section, known as the intermediate section, is 18 feet high and is also poured in 40-foot sections. The top layer is 16 feet high giving the wall a total height of 41 feet above the piling. Movable steel forms manufactured by the Blaw-Knox Company, are used on the upper two sections. In all, three "B" and "C" lifts are used on the three walls, the "B" forms being used on the intermediate section and the "C" forms on the top section. These forms consist, essentially, of light structural sections with vertical members supporting a horizontal frame spanning the wall of concrete to be poured. The entire unit is mounted on wheels which run on rails laid on the section of wall already poured. This affords a handy and economical method of pouring walls of uniform cross section of considerable lengths. Thirty-six hours after pouring, the forms are loosened up, pulled ahead to the new position, fastened into place, and then are ready for a fresh batch of concrete.

Here again the Bucyrus-Erie cranes perform a useful task. A heavy block is fastened by chains running to each side of the form, near the bottom. A cable is reeved through this block and through another one anchored some distance ahead. This cable is then connected to one of the drums on the crane. The operator applies the power and winds up the cable, pulling the form slowly but surely to its new setting.

Starting the top section of the landwall. The openings in the intermediate section provide a passageway for the water in filling or emptying the lock.

Pumpcrete system used

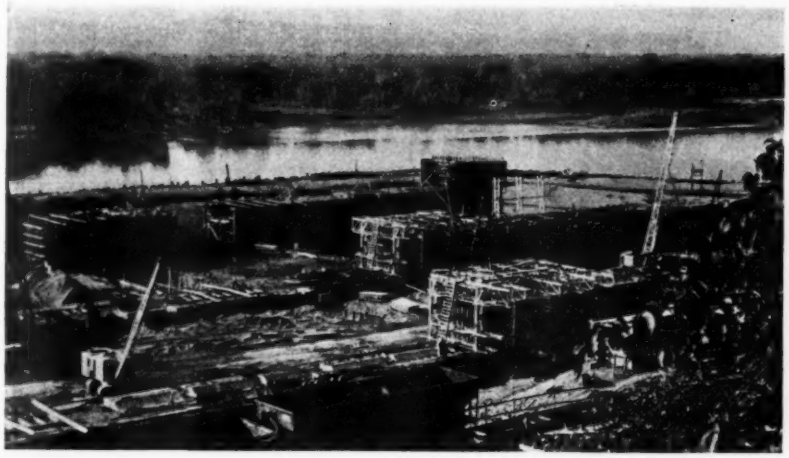
For several months after concreting was started two systems for conveying it to the forms were used, one being an industrial track system to the forms nearer the mixers and a Pumpcrete system to the more distant ones.

The industrial track system made use of two two-car trains, each pulled by a Plymouth gasoline locomotive. Each car carried a concrete bucket, holding one yard, to the forms where a 1¼-yard Osgood crane, with 75-foot boom, lifted the bucket from the car, swung it to the proper place in the form where it was dumped and then returned it to the car.

The Pumpcrete system pumps the concrete directly to the forms through a seven-inch line. Roller spouts, easily handled by one man, direct the concrete to the proper place in the form.

A comparison of the two systems for conveying the concrete from the mixers to the forms showed advantages in favor of Pumpcrete.

The Pumpcrete system is faster and gives better distribution of the concrete in the forms. As a result the industrial track system has been placed in reserve and another double-cylinder Pumpcrete installed in its place. In addition, a single-cylinder Pumpcrete, mounted on wheels, is available and will be used as a booster unit when the guide walls are poured. It will be connected into the concrete line from the double-cylinder unit and assist in pumping the concrete the long distances necessary to reach the guide walls.



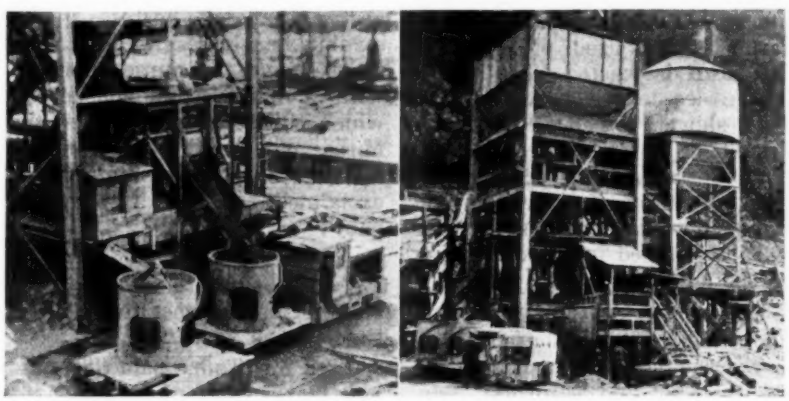
The three walls are rapidly taking shape. In the foreground the Blaw-Knox form is being pulled ahead to a new position for another batch of concrete.

Efficient mixing plant

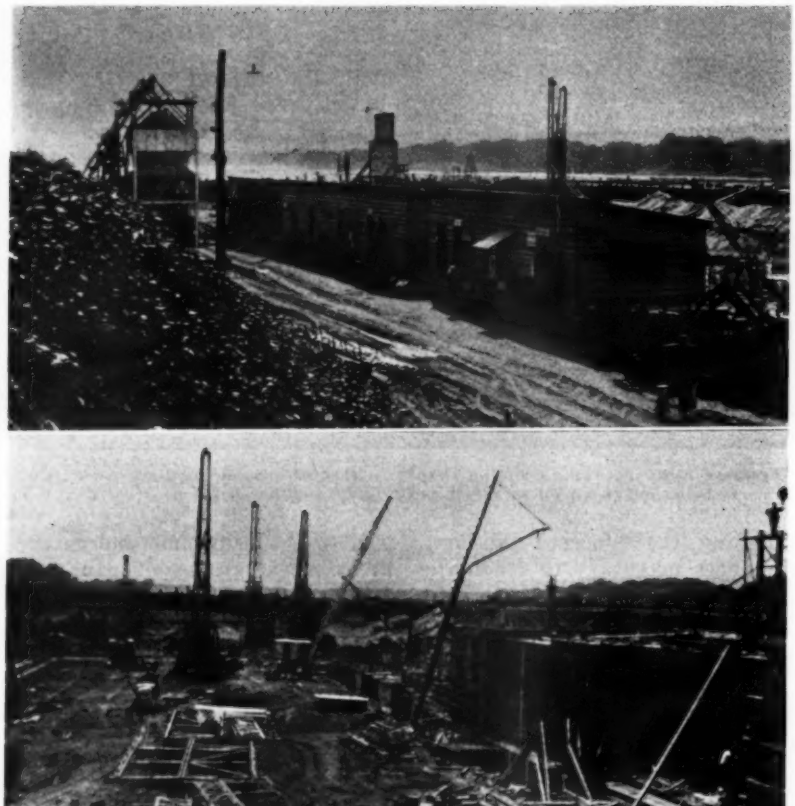
The concrete mixing plant is so arranged that everything is handled with a minimum amount of labor. Cement arrives in bulk cars from the Universal Portland Cement Company at Hannibal, Missouri. The cars dump into a bin beside the unloading track. A Fuller-Kinyon conveying system, operated by air from a portable Ingersoll-Rand air compressor, pumps the cement into a Blaw-Knox storage bin of 800-barrel capacity which stands beside the aggregate bin. Sand and gravel arrive in bottom dump cars and are emptied directly into the storage bins located beneath the siding. The bins have a total storage capacity of 32 cars. In addition to the usual fine and coarse gravel, two grades of sand are also used. The fine sand passes a 100-mesh screen and from 6 to 15% will pass a 200-mesh screen. The use of this fine sand in addition to the regular grade gives the concrete better workability and higher strength.

The storage bins empty through gates onto a 24-inch conveyor belt running across the front of the bins to a bucket elevator. Here the material is conveyed up to the top of the elevator and dumped into its proper compartment in the Butler aggregate bin by means of a rotating spout. One man is required to spot the cars over the storage bins by means of an electric Lidgerwood car spotter and dump them. Another man in front of the bins takes care of keeping the aggregate bins over the mixers filled. The discharge spout at the top of the elevator is controlled by him from the ground by means of a cable and handwheel properly marked.

One man on the weighing floor handles the weighing of the six classes of material. He dumps them into the mixers on the floor below. Here after mixing 2 minutes, the concrete is discharged into the feeding hoppers of the two Pumpcrete units. The concrete, using a fairly low water-cement ratio, shows high strength. Cylinders on a 7-day test have an average compression strength of approximately 2165 pounds per square inch. The con-



Left: The Rex 2-yard mixer discharges half its load into one of the concrete buckets. Right: The efficient concrete plant has a Butler bin on top fed by a bucket elevator and a 800-barrel Blaw-Knox cement storage bin to the right of it. One of the two 2-yard mixers feeds a double-cylinder Pumpcrete just below it.



Top: These buildings contain the shops necessary on a job of this size. Bottom: Looking downstream across the 1,000-foot cofferdam from near the upper gates.

crete contains 4½ bags of cement to the yard and 6 gallons of water is used to each bag of cement.

After the concrete is placed in the forms, it is thoroughly vibrated by Jackson internal vibrators, giving a dense, strong concrete with freedom from honeycomb.

Progress well ahead of schedule

At the rate of progress now being maintained, Superintendent McCormick is confident all concrete work will be done by November 15. Gates and equipment will be installed later and the project finished by Jan. 23, 1935, the completion date.

In accordance with other Federal jobs, the men work four 5-hour shifts six days a week. With short shifts the men are fresher and more efficient. During the height of activities, approximately 575 men were carried on the payroll. The payroll averaged $14,000 weekly.

This job is well equipped to perform the work efficiently, Walter W. Magee believes in thoroughly equipping each job he undertakes.

Stone used for the protective ledge at the outer base of the middle wall comes from a quarry about three miles away. Here the limestone is drilled and shot into rather small sized pieces. The fine stuff is wasted. The larger pieces are loaded by a ½-yard Unit shovel, owned by White & Leppla of Potosi, Wisconsin, under contract, on trucks which haul the stone to the job and dump it in place. Later on stone will be dumped into the cribbing of the guide walls.

A rented Koehring 1-yard clamshell machine is used to remove the muck around the pile heads ahead of the forms.

At the work-site near the siding are located the time-keeper's office, tool room, first-aid room, machine shop, electrical shop and carpenter shop.

The area within the cofferdam is kept dry by a Johnson well-point system. Seven hundred and ninety-five feet of pipe connects the points which are spaced on 5-foot centers. Five La Bour electrically driven pumps, 6"x8", connect with the suction lines. The Twin City Lumber Company of Minneapolis is furnishing all lumber used on the project. McClintic-Marshall Company of Chicago is furnishing all reinforcement bars, structural steel and gates. Sand is shipped in from Prairie du Chien, gravel from Waukesha.

For the U. S. Engineers, Major Dwight F. Johns is in charge of the district with offices at St. Paul. E. R. Romberg is resident engineer at Lock No. 9.

A contractor was invited to a dinner party given by one of his influential customers. The family was a distinguished one and our friend, the contractor, was considerably worried about the formality of the occasion. With some fear and trembling he dug his "soup-and-fish" out of the moth balls and fortified himself with several powerful drinks from a bottle of this stuff they sell nowadays to replace the good old bootleg.

He arrived safely and managed the preliminaries to dinner quite handsomely. As the cocktail took hold, however, he realized that he had taken a bit too much and resolved to be on his guard.

At this point somebody suggested that the hostess should exhibit her children. She rang the bell and the nurse appeared with a dainty pink basket in which reposed twins. When the nurse got around to the contractor, he rose, steadied himself and exclaimed, "What a beautiful baby!"

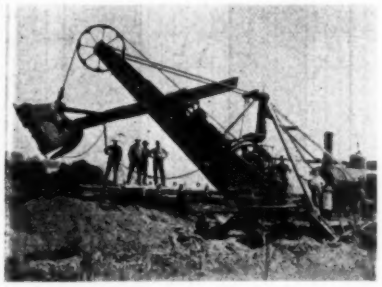
Two contractors who had been bachelor cronies met for the first time in five years.

"Tell me, Tom," said one, "did you marry that girl, or do you still darn your socks and do your cooking?"

"Yes," was Tom's reply.

Old Times & Old Timers

An Old Time Railroad Job in Indiana



THIS PICTURE of one of the first Atlantic type shovels built was sent us by Old Timer C. A. Sears of St. Albans, West Virginia. It was taken while the shovel was working on a grade reduction job between Ridgeville and Portland, Indiana, in 1910 on the G. R. & I. R. R. Old Timer Sears says:

"Note both crowding and hoisting engines are on the boom and the swinging engine is under the boiler. The shovel was propelled by the swing engine, which was also used to raise and lower the boom. There wasn't any hoisting brake, nothing but your steam ram to catch your bucket with. There was just a small cab for the engineer. These shovels were the fastest known at that time, and I am not sure there has ever been any thing built with more speed.

"There were two small cables run from your ram lever to your ram, which was also on the boom —one to pull out, and one to set your ram. When the shovel was dismantled, the boiler and swing engine was all that was on the car. This company had two of these shovels leased from the U. S. Equipment Company of Chicago. They were bought new to build the C. C. & O. R. R. and after its completion was sold to the Equipment Company.

"The little girl beside me is my daughter who is now married and has three great boys, whose chief hobby is a toy steam shovel and dump trucks.

"This job was started in May and took one year to complete. Raising a single main line 12 feet without blocking traffic is some job."

We appreciate this interesting letter from Old Timer Sears. Interest in shovels must run in the family, for his grandsons already seem to enjoy them.

More About the Fairbanks Back-Digger

OLD TIMER J. A. Barnard of Minneapolis, Minnesota, sent this snap shot of George Castle's Fairbanks back-digger. This is what he writes about it:

"This machine as pictured is working on the Montana project, and was later shipped to a ditch job in Minnesota near Crookston, Minnesota, where it stood for a good many years, and as far as the writer knows is still there, if not weathered away or picked to pieces, as have been scores of other machines of that type and date.

"George Castle gave us this picture about the time the ma-

chine was finished with the work in Montana. When last heard of, he was living in Crookston, Minnesota, and if living, he probably still lives there."

Thank you for the letter and the picture. It surely is a unique machine.

Digging the Des Moines Rapids Canal

HERE WE HAVE an interesting letter from H. B. Whitney, St. Charles, Missouri, who gives us details about early excavation work which make us realize the progress that has been made:

"Your published letters from Old Timers are of interest, but the real trouble on excavation work dates back to the time of bad mechanical features, long hours, poor lights, and bad designs.

"My experience on public work dates back to 1871, on the construction of the Des Moines Rapids Canal, now vanished, due to the dam at Keokuk, Iowa. I held the job as switch boy at the end of a side track where the trains met, or the engine was run around to get to the pulling end of the train. My wages were $1.00 per day. This is how fate got me:

"In 1870 I was ready for high school at Burlington, Iowa, when fate sold out the large machine shop and foundry where Father was superintendent, and he took the place of superintendent constructing the Des Moines Rapids Canal under George Williams, Keokuk, Iowa, and James J. Dull,

(*Continued on page 467*)

Help, Old Timers!

W. H. Mueser of the firm of Moran and Proctor, consulting engineers of New York City, writes as follows:

"We are interested to learn when and where the first clamshell or orange-peel bucket was used for the excavation or the dredging of a well or bridge pier or similar structure. We know, as a matter of fact, that about 1860 for the Kansas City Bridge and about 1867 for a railroad bridge at Quincy, Ill., excavation was done by a so-called ladder bucket, which is a steel frame lowered into the well along which a scoop travels up and down bringing the excavated material to the surface. Furthermore, we know that an orange-peel was used to dredge and excavate the caissons for the piers for the Hawkesbury Bridge at New South Wales about 1886. Likewise, a clamshell was used for the piers of the Brooklyn Bridge in New York about 1883. Therefore, sometime between the approximate dates of 1860 and 1885 the orange-peel and clamshell bucket came into use and assumed its importance in the field of excavating equipment.

"In other words, we would like to know on which job and in what year this equipment was first used."

Do any of you Old Timers know the correct answer to this question of excavating history, or where we can find the answer? Can any of our Old Timers who were working back before 1885 tell us when they used or saw used, clamshell or orange-peel buckets for excavating or material handling? If you can give us any information on the subject, we hope you will write and tell us.

EXCAVATING ENGINEER

A Monthly Publication Devoted to Excavating and Allied Subjects

The Excavating Engineer Publishing Co.
South Milwaukee, Wisconsin

F. O. WYSE
Managing Editor

ARNOLD ANDREWS
Editor

E. M. HEUSTON
Advertising Manager

E. T. OBENCHAIN
Assistant Editor

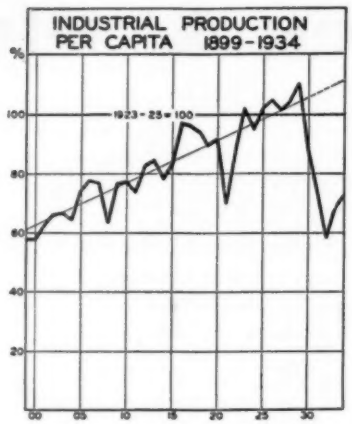
The Business Situation

MANY generations have lived and died without seeing such an interest in economic problems as the average man is exhibiting today. It is natural that during business depressions interest in economics should greatly increase, and it is undoubtedly true that, partly because of the complexity of our economic life today, more persons than ever before are discussing the involved problems at present confronting us. Almost every nation is experimenting with managed recovery and the problem is complicated by the fact that, in some countries particularly, there are two very important factors—the first, actual economic history, and the second, public opinion. This is particularly true of our own country and makes unusually important the correction of popular economic fallacies.

The Business Bulletin for September 15 published by the Cleveland Trust Company has a very interesting discussion of seven popular economic misconceptions. We regret that space does not permit our publishing in full their discussion of these seven fallacies.

Overproduction

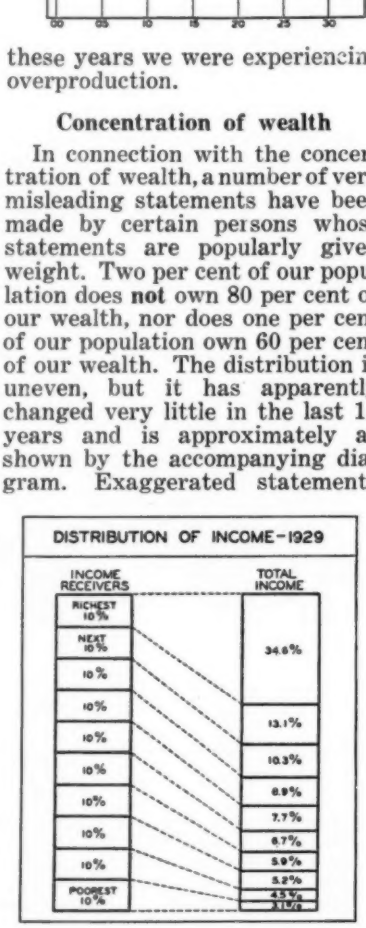
A plotting of industrial production per capita for the last 35 years shows an almost uniform general trend from 1899 to date which suggests very definitely that overproduction during the late '20's can not be a major cause of the depression. During this period, production, prices and employment were in unusually good balance. The burden of proof is on those who base their arguments for new forms of regulations on claims that during



these years we were experiencing overproduction.

Concentration of wealth

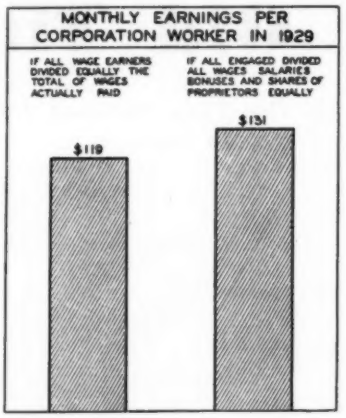
In connection with the concentration of wealth, a number of very misleading statements have been made by certain persons whose statements are popularly given weight. Two per cent of our population does **not** own 80 per cent of our wealth, nor does one per cent of our population own 60 per cent of our wealth. The distribution is uneven, but it has apparently changed very little in the last 15 years and is approximately as shown by the accompanying diagram. Exaggerated statements



of this phase of our national life are usually very misleading.

Redistribution

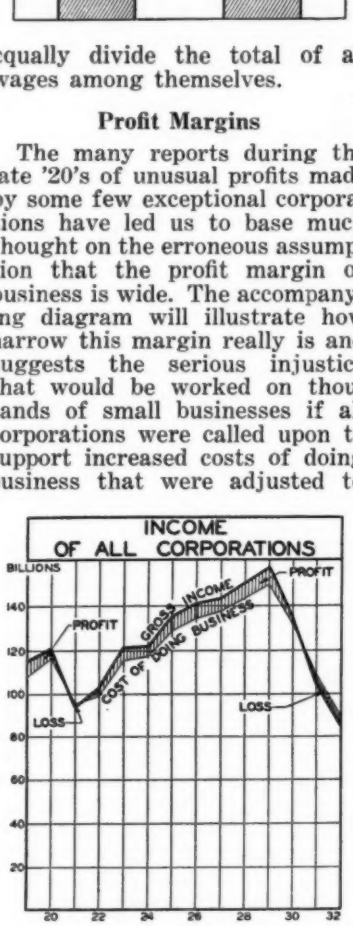
To those who would foster redistribution of income, the chart following may be of interest. If all wages, salaries, bonuses and shares of proprietors (divided profits) were divided equally among all those engaged in industry, the increase would only be approximately 10 per cent greater than if all wage earners were to


MONTHLY EARNINGS PER
CORPORATION WORKER IN 1929
IF ALL WAGE EARNERS DIVIDED EQUALLY THE TOTAL OF WAGES ACTUALLY PAID
IF ALL ENGAGED DIVIDED ALL WAGES SALARIES BONUSES AND SHARES OF PROPRIETORS EQUALLY
$119
$131

equally divide the total of all wages among themselves.

Profit Margins

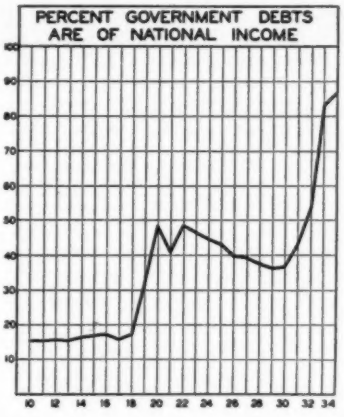
The many reports during the late '20's of unusual profits made by some few exceptional corporations have led us to base much thought on the erroneous assumption that the profit margin of business is wide. The accompanying diagram will illustrate how narrow this margin really is and suggests the serious injustice that would be worked on thousands of small businesses if all corporations were called upon to support increased costs of doing business that were adjusted to



the capacity of only the large, strong and successful ones.

Taxation

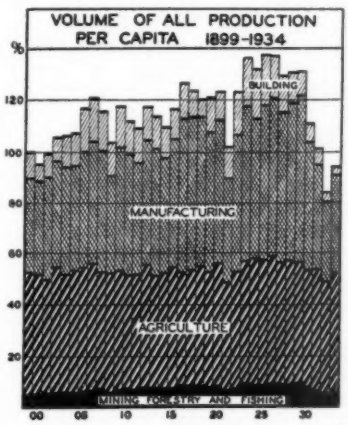
The expenditures of our government over and above current income are a debt which must be paid by taxing future generations. Before the war the relationship of all government debts, national, state and local, amounted to approximately 15 per cent of the total annual income of our citizens. Partly because of the de-



crease in national income and partly because of the tremendous increase in our public debt, we as a nation owe approximately 90 per cent of our present annual income. One of our most important objectives at the present time should be to check our mounting governmental expenditures and to increase our national income.

Inflation

Inflation is the most insidious fraud among all the economic fallacies, and it has been ever since the invention of money. The simple idea that makes men favor it is that since we all use money to buy the things we want, we should be able to buy more of them if the government would increase the amount of money in circulation. The fact is that in order to have more goods we must produce more, and then we shall have more money. Increasing the money raises prices, but induces fears about the future of money that result in reduced production.

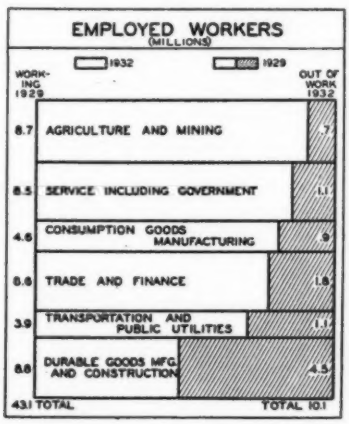


In the diagram the columns represent the changes in the physical volume of all production in this country per unit of population during the past 35 years. The volume in 1899 is taken as equal to 100, and during this depression production per person has fallen even lower than it was at the close of the last century. Production is purchasing power. We all produce goods or services, and by using the money we receive for them we buy the goods and services of others. The total of them that we all produce is all there is to be divided among us.

In recent years most of the nations of the world have relearned the old lesson that the bountiful manufacturing of money does not successfully stimulate the production of goods. The most bitter opponents of inflation are those peoples in other countries that have had recent personal experience with it. In near unanimity they join in agreeing that their inflations ended in failure. Our need is not inflation, but the removal of the barriers that impede production.

Purchasing Power

We have heard so much about the great benefits to be derived from restoring purchasing power and thus increasing the amount of business, that we have been prone to overlook the fact that our greatest unemployment today lies in the durable goods industries, including the construction industry, and that activity in these industries depends not on the current purchases of our citizens, but upon availability of credit—the ease with which funds may be borrowed through bond issues and mortgages. Increasing consumer purchasing power would unquestionably improve conditions in the consumer goods industries where only a comparatively minor amount of unemployment exists. Re-employment in the durable goods industries depends on reviving the markets for our securities and re-establishing faith in the future of our money. If these workers could be re-employed and kept so, most other unemployment would cure itself.



Old Times & Old Timers

(Continued from Page 465)

Pennsylvania, who were the contractors. We moved to a central location for the work, a small village called Sandusky.

"A large force of men was employed, about half of them Swede immigrants and the other Irish laborers. All were high class laborers. Common labor was paid $1.75 per day, ten hours' work; special workers received $2.00; engineers, $3.50; firemen, $2.25; trainmen, $2.00; blacksmiths, $3.00; harness makers, $3.00; switch boys, $1.00, and $1.25 when tending several switches. Pay day was the 15th of the following month.

"There were about 8 miles of main track, 4-foot gauge, three locomotives built by Smith & Porter of Pittsburgh, Pennsylvania, one old engine that was rebuilt into a modern locomotive with new parts from the Smith & Porter shops, and 300 or more cars. The dirt cars were one-way dump of the rocker type, with beds 6′ by 6′ and 18 inches deep. Rock cars were the same size with drop doors on each side. The car sills were 6″ by 8″ oak, four wheels and the bearing boxes were bolted to the side sills with an extended lip, which had a gutter for oil. They had babbitted journals with waste-packed cellar boxes.

"At Sandusky there was an engine house with four wash-out pits, a small machine shop, good-sized car shop for repairs and building new cars, a harness shop and blacksmith shop. Dad was a pusher and he made the work hum in spite of the old day mechanical troubles.

"The job that I started my career on paid $2.50 per cubic yard for rock and seventy-five cents for earth. A lot of the rock was short haul, but the earth was full five miles away. If this letter is of interest I will be glad to tell you what it meant to handle rolling equipment at high speed under difficulties. I was a boy then, but my education continued as I stayed on the job and grew up with improvements maturing."

FIELD NOTES

Water Tank Lowered 20 Feet

THIS TALL water tank presented an unsightly appearance as it stood many feet higher than the trees which surrounded it. It was decided to lower the tank sufficiently so that

it would be somewhat concealed by the tree-tops. This was done economically by using an oxy-acetylene cutting blowpipe. The leg flanges were first cut to points, and then cut off four inches at a time until the tank had been lowered a total of 20 feet.

Unforeseen Rock Conditions

SOME DAY I'm going to take time off and write a song parodizing the old song used when a basso wanted to show how far down the scale he could sing. Instead of "Sailor Beware," the title will be "Bidder Beware." And instead of the line "Many a brave sailor is asleep in the deep, so beware," etc., our song will run, "Many a brave bidder has slipped in the red, so beware," etc.

This song writing impulse is given considerable impetus on reading what Mr. Justice Pound of the New York Court of Appeals—one of the foremost jurists in the country—has to say about the rights of highway contractors who ran into solid rock that no one excepting Mother Nature knew anything about.

In this case (Weston v. State, 186 N. E. 197) it appeared that a state highway contract covering a quarter of a mile between Peekskill and Fishkill involved a 600-foot cut through a hill. Instructions to bidders pointed out that there was uncertainty as quantities of excavation, etc. And the contract recited that the contractors had fully informed themselves as to the conditions affecting the job, etc. The preliminary estimate of the engineer showed 198,430 cubic yards of "unclassified excavation."

The successful bid was $174,407.45, some $93,000 below the engineer's estimate, 68 cents per cubic yard for unclassified excavation.

The cut through the hill proved to be substantially through solid rock.

The contractors asked the State to allow $110,119.09 for excess cost. The Court of Claims, authorized to consider the claim, dismissed it. And the Court of Appeals upheld the decision, saying, in part:

"Now it is argued that, although claimants made no adequate investigation as to subsoil conditions at the site of the work, the state may recognize and has recognized a moral or equitable obligation to compensate them for the increased cost of rock excavation. . . .

"There is no moral obligation to give public money to disappointed contractors. . . .

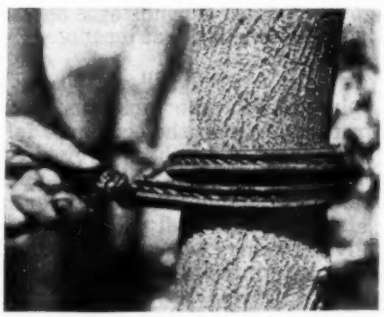
"The preliminary estimate detail sheet made up by the state for its own use showed approximately 65 per cent earth and 35 per cent rock on the contract site. These were not respresentations upon which the bidder might rely. If claimants relied thereon they did so at their own risk. 'The most they could ask for in regard to this information was good faith.' . . . The contractors assumed the risk. If the excavation had turned out to be all earth, no one would suggest that the state would have a legal or equitable claim against the contractor for reimbursement on the ground of mutual mistake. It would be a strange morality which would permit one party to escape the terms of an unprofitable contract while the other party was held thereto. No one would extend a rule of morality to require the holder of a profitable contract to surrender a portion of his legitimate profits.

"One who makes a contract cannot be certain that he will be able to do the work for the amount of his bid. The risk of failure falls upon his shoulders. . . .

"The contractor had the same opportunity as the state to make investigations. When no claim of deception, inequality, or inequity is presented he is bound by the terms of his contract. Justice and equity do not require the state to reimburse a contractor for increased expense unless the mistake was due to the act of the state, not even where the increased cost was due to the unexpected event of the World War."

—Arthur L. H. Street,
Attorney at Law.

Good Guard for Rope



VARIOUS impractical things are often used to prevent chafing of tree bark when a rope must be hitched around a trunk. A practical thing to use is an old auto window-glass felt runner. Peel off the felt and you have a channel-strip of soft but tough pliable rubber. Ordinary light ropes or cables fit snugly and neatly into this, which gives a wide protective bearing against the tree bark and prevents chafing or slipping. This old felt runner is very easy to get, and handy to keep in the tool box.

Frank W. Bentley, Jr.

The click of knitting needles, the creak of a rocker, and the tick-tock of a grandfather's clock, were all that disturbed the soothing silence of the room. With childish curiosity little Ellen sat watching the purls and stitches.

"Why do you knit, grandma?" she asked.

"Oh, just for the hell of it," the old lady replied.

EQUIPMENT
You Ought to Know About

New Lightweight Drifter

A NEW DRIFTER, weighing 126 pounds, has been announced by Gardner-Denver Company. According to officials of the company, this new drifter,

which can also be equipped with spring handles for use as a sinker, has already proved itself to be the fastest rock drill in its class, as well as the lowest in air consumption, regardless of the character of ground.

Among the features built into this drifter are an automatic valve which gives high speed with low air consumption; special long-wearing, bronze, removable, front-cylinder liner; direct center exhaust; rugged throttle valve with outboard bearing; and three-point cross-head support. An integral lubricator supplies lubricant to all parts of the machine, a chamber surrounding the front cylinder bushing being used as a reservoir from which the lubricant is fed to all parts of the drill.

The D-79, it is stated, is remarkably free from vibration, due to its special construction, and is also light in weight for easy handling. This drill is the second of the Gardner-Denver "D" Series Drills to be announced. The first of the series, the D-89 —a 3½" bore drill—is reported to be gaining steadily in popularity.

New Waterproof Bag

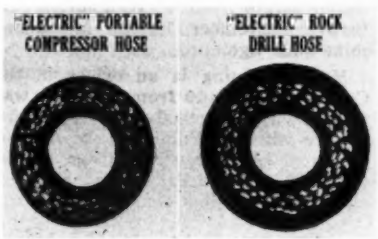
A NEWLY designed bag is now manufactured by the Bemis Bros. Bag Company, of 405 Poplar, St. Louis, which they state is absolutely air-tight, water-proof, sift-proof, and gas-proof. The bag consists of an inside layer of flexible creped kraft paper impregnated with a layer of water-proof adhesive that also seals the pores in the outside layer of burlap or cotton and cements both layers together. This gives a 3-ply construction without the inconveniences of extra inner linings that cause packing troubles. The manufacturer will send a sample bag on request.

Two New Types of Air Hose Announced

RECOGNIZING that a single grade of air hose will not meet every type of service, the Electric Hose and Rubber Co., Wilmington, Delaware, have recently developed two new types of air hose, each especially suited to a field in which ordinary hose seldom gives satisfactory life.

Electric portable compressor hose is designed especially for direct connection to portable air compressors or for other service where excessive amounts of oil may be blown into the hose. This hose has a lining of a special compound which is resistant to internal heat and will not disintegrate or peel off from constant contact with oil. As a consequence, the hose lasts much longer and no rubber passes through with the air to clog the tool.

Electric rock drill hose has been developed especially for service in mines, quarries, con-

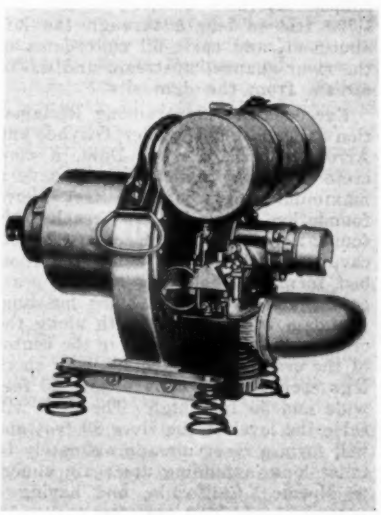


struction work, etc., where the hose is constantly dragged over sharp rocks and rough surfaces which tend to cut or shear it. It is covered with an extra heavy layer of rubber especially compounded and cured to resist abrasion and cutting action. Its tube is of special composition to resist oil and heat.

Both types are reinforced by strong tightly twisted cords spirally braided around the tube and completely surrounded by rubber — a construction originated by the Electric Hose and Rubber Co.

New Portable Floodlight System

THE HOMELITE Corporation of Port Chester, N. Y., announces a new portable 1250-watt generator and floodlights which enable construction to continue after dark. The sturdy Homelite generator weighs



only 89 pounds complete with its built-in gasoline engine . . . can easily be carried by one man . . . is fully automatic and requires no adjustment whatever.

It is claimed that the light weight and compactness of this plant enable it to be stowed in an out-of-the-way corner of an automobile or truck. And that this floodlighting system is proving extremely profitable to general building contractors, water departments, highway departments, public utility companies and municipalities for both construction and repair jobs. In the daytime the Homelite Generator can be used for operating electric saws, drills, hammers, sanders, paint spray guns and other electrically operated equipment.

Complete information regarding the equipment mentioned on this page may be had by writing the manufacturers. We will appreciate your mentioning EXCAVATING ENGINEER.

SHOTS *from the Firing Line*

Six Companies Awarded Parker Dam

THE BUILDERS of Boulder Dam were awarded another Government contract recently when Secretary Ickes approved an award to the Six Companies Inc. (of Delaware) for building the Parker Dam on the Colorado River, about 15 miles northeast of Earp, California, and Parker, Arizona. Of the four bids opened on July 26 at Los Angeles, their bid of $4,239,834 for the two schedules was the lowest. The work comprises construction of the dam and appurtenant works consisting of two 29-foot diameter horseshoe-shaped diversion tunnels, each about 1,700 feet in length through the left abutment, and earth-fill cofferdams in the river channel upstream and downstream from the dam site.

Exceeded in height among Reclamation dams only by Boulder, Owyhee and Arrowrock, the Parker Dam, a concrete arch-type structure, will have a maximum height of 340 feet above foundation bedrock. To reach this foundation it will be necessary to excavate about 240 feet below the river bed, forming a hole deep enough to accommodate a 20-story office building. The dam will have a length along the crest of 800 feet. Located in the center of the crest will be five spillway openings each controlled by a gate 50 feet wide and 50 feet high. The dam will raise the level of the river 80 feet and will form a reservoir approximately 50 miles long, extending upstream almost to Needles, California, and having a capacity of 717,000 acre-feet.

Among the principal items of work are 2,265,000 cubic yards of excavation, 108,000 cubic yards of tunnel excavation, 438,000 cubic yards of earth fill in cofferdams and placing 287,700 cubic yards of concrete. Three and one-half years are allowed to complete the contract. The project includes power development with a 4-unit plant of 110,000 horsepower capacity, but construction of the power plant will be covered in a subsequent contract.

The Parker is the diversion dam for the Colorado River Aqueduct now being built by the Metropolitan Water District of Southern California at a cost of $220,000,000 to carry Colorado River water a distance of 239 miles to provide a supplemental water supply for Los Angeles and neighboring cities. Under a contract with the District dated February 10, 1933 the Bureau of Reclamation will construct and operate the dam and reservoir and will have the right to one-half of the power privilege. The Public Works Administration has allotted $2,000,000 to the District for beginning construction of the project, which is estimated to cost $13,000,000.

There are eight contracting firms that make up the Six Companies, Inc., as follows: Utah Construction Company, McDonald & Kahn Co., Ltd., W. A. Bechtel Co., Inc., J. F. Shea Co., Inc., Henry J. Kaiser Co., Morrison-Knudsen Co., General Construction Co., and Warren Brothers Co. All but the last two are members of the group now breaking all performance records in building the 730-foot Boulder Dam. Olaf Laurgaard is Construction Engineer for the Bureau of Reclamation with Headquarters at Earp, California.

Hardwick & McGlone Low Bidders Fort Peck Spillway

AT A LETTING held September 24, Hardwick & McGlone of Kansas City were low with a bid of $7,918,530 for the construction of the Fort Peck Dam Spillway. The unit price on 7,160,000 yards of shale excavation and 5,922,000 yards of overburden excavation was 41c. Included in the project is the furnishing and placing of 18,000 tons of reinforcing steel for $1,350,000 and placing 249,100 yards of concrete for $786,650.

Major Philip B. Fleming Named Deputy PWA Administrator

PUBLIC WORKS Administrator Ickes has designated Major Philip B. Fleming as Acting Deputy Administrator. Major Fleming, who has been executive officer of PWA since its beginning, will assume immediately the duties of Col. Henry M. Waite, Deputy Administrator, whose resignation, effective September 1, was announced some time ago.

Major Fleming is an officer in the Corps of Engineers from which he was temporarily detached last year for service with the Public Works Administration. As executive officer during the past year he has served as principal assistant to Colonel Waite.

Progress on Public Works Highways to September 22, 1934

PROGRESS MADE on emergency construction of public works highways to September 22 under the supervision of the U. S. Bureau of Public Roads shows a total of 581 projects, estimated to cost $27,032,000, approved but contracts not yet awarded; 386 projects, estimated to cost $13,688,000, awarded but not yet under construction; 3,186 projects, estimated to cost $209,-149,000, under construction; and 4,955 projects completed at a cost of approximately $192,653,000. The 3,186 projects under construction involve 8,978 miles of road and are giving regular direct employment to 212,544 men.

Canada

Ontario Notes

By HENRY F. UNGER

An offer from the **Warrenite Bituminous Paving Co.**, (recently awarded a contract for paving the Fort William road, connecting with the International Highway) was accepted by the Fort William City Council, whereby the company will build the road with a Warrenite surface instead of a Topeka surface as originally specified. This new surface will give the city a three and half-inch black base and a half-inch bitulithic wearing surface.

Steam shovels will be used in excavating the ground for Fort William's new Post Office, according to Joseph M. Pigott, of the **Pigott Construction Co. Ltd.**, Hamilton. This company has the contract for the new structure which will be erected on the east side of Syndicate Avenue, between Victoria Avenue and Donald Street, at an estimated cost of $250,000. Test pits have been dug to reveal the nature of the ground and actual excavating is to start soon. Ten days will be required for the excavating.

New York Notes

By G. E. PETERSON

State Highway awards since August 24th have included the following: **Stento & Serefini**, Binghamton, $31,002 for bridge and approaches in Chemung County; **Cold Spring Const. Co.**, Akron, N. Y. $127,691 for 2.93 miles 20′ concrete in Wyoming County; **Fred A. Ray**, Herkimer, 2 jobs, $21,530 and $63,076 for bridges and approaches in Otsego County; **Whitmore, Rauber & Vicinius Inc.**, Rochester, $261,825 for 6.43 miles variable width concrete in Genesee & Livingston counties, and $139,303 for 3.88 miles of 20′ concrete in Jefferson County; **D. W. Winkleman Co.**, Interlaken, $103,174 for 3.31 miles of grading and gravel in Livingston County; **Leydecker Bros.**, Williamsburg, $39,053 for bridge and approaches in Niagara County; **Robt. E. Tompkins**, Rochester, $46,456 for bridge and approaches in Monroe County; **Tomack Subsidiary Inc.**, Rochester $66,274 for 2.79 miles 20′ macadam in Monroe County; **Spellman-Oliver Co.**, Chateaugay, $18,471 for bridge in St. Lawrence County; **Harry Patterson**, Buffalo, $30,-578 for bridge and approaches in Steuben County; **J. A. Spooner**, Albany, $10,717 for bridge and approaches in Otsego County; **Utica Const. Co.**, Utica, $87,378 for 2.08 miles 20′ macadam and concrete in Fulton County; **Law Bros.**, Herkimer, $308,088 for 7.24

miles concrete including 206,160 yards of excavation in Oneida County; **Holmes & Murphy**, Orchard Park, $142,301 for 1.9 miles paving in Cattaraugus and Erie Counties; **Louis Longhi**, Torrington, Conn., $153,334 for 4.3 miles of 20′ macadam in Renssalaer County; **Port Trading Corp.**, Albany, $26,970 for .37 mile macadam in Washington County; **I. M. Ludington Sons, Inc.**, Rochester, $96,881 for grade separation in Renssalaer County; **Johnson, Drake & Piper**, Freeport, L. I., $99,809 for .76 miles variable width concrete in Nassau County; **John Bellardino**, Seneca Falls, $133,791 for 4.03 miles 20′ concrete in Onondaga County; **Green Island Const. Co.**, Green Island, $132,373 for 3.56 miles 20′ macadam in Hamilton County; **Steve Scullen**, Cohoes, $156,185 for 4.52 miles 20′ concrete in Saratoga County; **Ludke Bros., Harrington Co.**, Auburn, $24,616 for bridge in Cortland County; **Davis & Stearns**, Whitney Point, $88,093 for 2.51 miles 20′ concrete in Schenectady County; **Tyne & Willy**, Binghamton, $88,960 for 2.03 miles 20′ concrete in Tioga County; **Garafano Constr. Co.**, Mt. Vernon, $137,092 for 1.60 miles of 40′ concrete in Queens County; also $204,174 for 1.34 miles concrete on the Interboro Parkway in Queens County; **Wm. J. Gallagher**, Medina, $108,061 for 4.06 miles 20′ concrete and macadam in Orleans County; **Columbia Bridge Co.**, Ancram, $38,131, for bridge and approaches in Oswego County; **P. T. Cox**, N.Y.C., $146,673 for grade separation on the Laurelton Parkway in Queens County; **The Arthur A. Johnson Corp.** of Long Island City, $272,457 for grading 2.27 miles on the Grand Central Parkway extension; this job had a total of 900,000 cu. yds. of excavation and **Johnson, Drake & Piper** of Freeport, L. I. submitted low bid on the job.

James O'Connell & Sons Contracting Co., Bronx, has about completed the excavation on the P. T. Cox job on the Tri-Boro Bridge approach in Astoria. Mr. O'Connell used his Type B-2 Bucyrus-Erie steamer operated by Sam Hanley and his 43-B Bucyrus-Erie with Bob McCarthy behind the levers. According to Mr. O'Connell the 43-B gave a pretty good account of itself on this job. And according to all reports, Mr. O'Connell gave a good account of himself as a dirt mover having handled around 150,000 yards of material in about 80 working days.

The Arundel Corp. of Baltimore was the low and only bidder with a bid of $889,000 for 3,500,000 yards of fill on the Queens approach to the Tri-Boro Bridge.

Ryan & Davis have about completed the excavation on the Rosoff job at Whitney Point, N. Y., where they have been using their Bucyrus-Erie 43-B and their 1¼ yard Koehring machines.

Chas. Beckwith & Co., Bronx, were low bidders on several sections of the Eastern Boulevard improvement for the Bronx approach of the Tri-Boro bridge.

Andrew Weston of Woodmere, L. I., submitted low bid for about 23 miles of water lines in Suffolk County.

Poirier-McLane Corp. of New York were awarded contract for sewer system and pumping stations for the village of Great Neck, L. I. Their bid for this work was $605,604.

Turner Constr. Co. of New York submitted a low bid of $570,000 for the construction of buildings, etc., for the new Bronx Municipal Market.

$2,800,000 has been allotted to the St. Lawrence Bridge Commission for the construction of a high-level toll bridge across the St. Lawrence River between Ogdensburg, N. Y., and Prescott, Ontario, according to an announcement by PWA.

New Jersey Notes

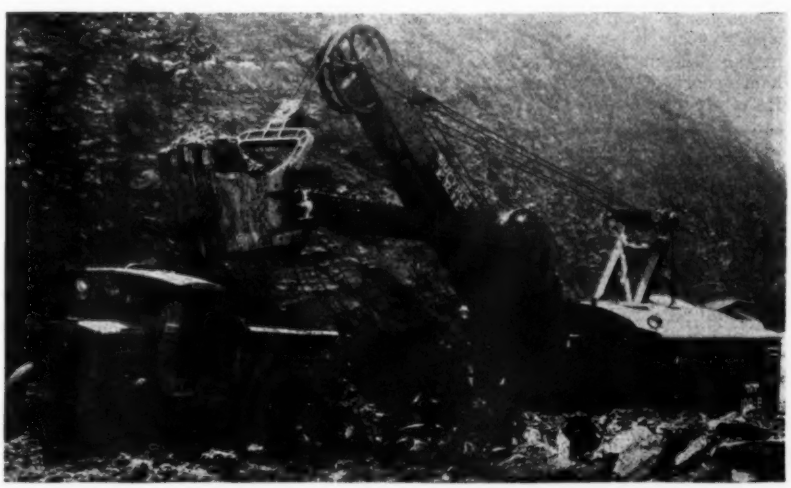
The State Highway Commission will receive bids October 15 for the grading and paving of a 5.3-mile section of Route 10 in Morris County. This project involves 458,000 yards of earth, 20,000 yards of rock excavation, 16,200 yards of wet excavation and 146,481 square yards of 9-inch concrete pavement.

Delaware Notes

The following low bids were received September 19 by the State Highway Department; 0.5 mile 22-foot concrete pavement in New Castle for $47,910, and 3.2 miles of 20-foot concrete pavement near Glasgow, for $133,770 from **Vincent Schiavi** of Townsend; 7.4 miles of 20-foot pavement on Bay Road for $161,336 from **George & Lynch** of Dover; and 3.89 miles of 20-foot pavement, Bay Road, for $141,815 from **W. W. Truitt** of Lincoln City.

Pennsylvania Notes

The Plymouth Excavating Company of Plymouth are stripping anthracite coal at the Bast Colliery for the Philadelphia and Reading Coal and Iron Company. The photograph below shows their Bucyrus-Erie 100-B electric shovel about to place a dipperful of dirt and rock into one of their eight Linn tractors.



Duff and Ellberg of Warren are working on a road project near Spring Creek. Mr. Ellberg, who runs the ⅝-yard Bucyrus-Erie 10-B shovel on the job, tells us he has loaded 300 yards of gravel from a 12 to 15-foot bank to trucks in five hours. The crowd rope is still in good condition after 192 hours of service.

Maryland Notes

The following awards have been announced by the State Roads Commission; 1.15 miles paving in Baltimore to **National Paving and Construction Company** of Baltimore for $73,615; 2.45 miles concrete paving in Calvert County to **L. R. Colbert** of Fredericksburg, Va., for $60,577; and the Bath Street viaduct, 2,075 feet long, in Baltimore to **G. A. Fuller Company** of Washington for $894,400.

Georgia Notes

The State Highway Board has made the following awards: **Broadbent Construction Company** of Ocala, Fla, 6.5 miles paving in Camden County for $62,696; **E. A. Hudson and Sons** of Bolton, 4.2 miles paving in Fulton-Clayton Counties for $72,671, and 2.18 miles grading in Rockdale County for $23,309; and **M. R. Woodall Company, Inc.** of Atlanta, 8.1 miles grading in Robun County for $72,323.

Ohio Notes

By HENRY F. UNGER

The Fitzgerald Construction Co., has completed a road job in Ashtabula.

The A. L. Connelly Construction Co., is excavating for sewer mains along Moreland Road and also paving that street in Shaker Heights.

Resurfacing of U. S. Route 20 through Willoughby at a cost of $40,000 has been approved as a PWA project. Erie Street, main thoroughfare through the village, will be widened as part of the program. Contracts will be awarded soon.

Since the tug strike has been settled, dredging in the Cleveland harbor on a

Shots From the Firing Line—
Continued

$472,000 contract held by the **Great Lakes Dredge & Dock Co.**, has started anew.

City officials in Wellsville said United States Senator Robert J. Bulkley of Cleveland and Congressman Lawrence E. Imhoff of St. Clairsville, representing the Eighteenth District, had pledged their aid to an application for a PWA grant of $192,000 for a **municipal filtration system** in Wellsville. The application, approved at Columbus, is before PWA officials at Washington.

Construction of Conneaut's **$63,000 municipal dock** is now under way, with a crew of 100 men making a four and one half-acre fill in back of the dock which will be constructed in the lake at the north end of Broad Street.

The State Relief Commission has approved a **$12,555 water works project** for Erie County.

A sale of the stone quarries of the Higgins Stone Co., Bellevue to the **France Stone Co.**, Toledo, was completed with the filing of deeds in Seneca and Sandusky Counties. The properties included five quarries in York Township, Sandusky County; one quarry in Thomson Township, Seneca County, and one at Bellevue.

Cuyahoga County will get $39,457 in highway improvements under the $1,189,100 program approved by the State Highway Department in Columbus. The work was awarded the **Trinidad Paving Co.** of Cleveland, low bidder. Separation of the Erie Railroad grade on State Route 8, between Cleveland and Akron, is scheduled.

A **$500,000 contract** for building the 14-mile pipe line to carry the sewage sludge from the lake shore plant to the digestion chambers adjoining the small disposal plant in Cuyahoga Heights will be soon awarded.

CHARLES H. SUNKLE

Charles H. Sunkle, 38, of Cleveland, who was an inspector for eight years in the division of streets died at his home shortly after suffering a stroke. He is survived by one daughter, Elaine.

Excavating for the large addition to the Fisher Body Company's plant at East 140th Street and Coit Road, in East Cleveland has been started. The J. A. Utley Co. of Detroit engineers for the Fisher organization awarded the general contract to **A. L. Sedory & Co.**, Union Trust Building, Cleveland, at $672,780.

On their low bid of $867,541, **Bryant & Detwiler**, Detroit contractors, were awarded by Service Director William J. Lucks of Columbus the contract for the first section of the $3,400,000 sewage disposal plant to be erected for the Ohio city. The bid was almost $200,000 under the city engineer's estimate.

The State Highway Department announced it will finance a **$100,000 repair job** on the Harvard-Denison Bridge in Cleveland with money to be taken from Federal highway funds alloted the state.

Two hundred and fifty men returned to work when the **Crescent Portland Company** resumed operations at Crescentdale. The plant has been idle for many months.

U. S. army engineers are on Johnson's Island, Sandusky Bay, making a survey preliminary to the starting of work on a **$15,000 dock improvement** authorized by Congress.

Engineers of the Ohio Department of Highways have designed a traveling mixer that has enabled them to **set new records** in resurfacing roads with asphalt-bound aggregate. An example of the speed was given on United States Route 50 immediately east of Chillicothe when the crew completed one side of a six-mile stretch of road on a Monday. On Tuesday the other side was completed and at no time was traffic interrupted.

Federal aid for the proposed **$600,000 breakwater** at Marblehead near Lakeside has been refused by the PWA.

The Clyde village council voted a bond issue of $142,000 to finance the erection of a **water filtration and softening plant.** A 50-acre tract of land along Raccoon creek will be bought and the plant will be started as soon as plans and specifications are completed by George Champe and Associates of Toledo. A reservoir also will be constructed and dams will be installed in this creek.

The United Engineering Co. received an order from the **Ford Motor Co.** for a $400,000 cold strip mill. The mill will be built in Youngstown, and installed in the River Rouge plant of the Ford Motor Co.

Two hundred miners employed at the High Shaft mine of the **Steubenville Coal & Mining Co.**, in Steubenville walked out when their demands that three men who had been discharged be reinstated were rejected. The company operates the largest mines in this vicinity.

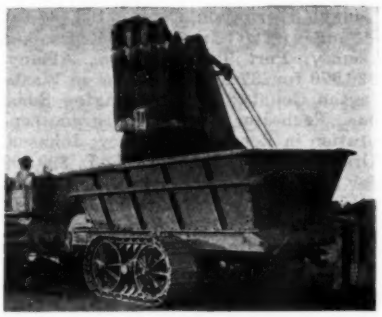
The State Relief Commission approved a **$30,951 project** for removing rails and relaying paving on Zanesville city streets.

Bids were asked on a **$95,000 water works plant** for Fairport Harbor Village as a PWA project. Of the total, the city will receive $19,000 as a grant. Work will be started about October 15th.

The Desch and Green Construction Co., are rapidly completing some road work in Willoughby.

The Hollinger-Davidson Company of Akron submitted low bid of $71,207 on the 2.16-mile concrete paving project in Erie-Huron Counties.

Tennessee Notes



The Lebanon Bridge Company of Nashville is using up-to-date equipment on their road job near Shelbyville. The photograph above shows their 43-B Bucyrus-Erie shovel loading into an 8-yard Athey dump wagon pulled by a Caterpillar Diesel fifty.

Mississippi Notes

Cobb Brothers Construction Company of Meridian was awarded a 12.2-mile grading project including culverts and bridge in Clarke County for $74,982 and a 5-mile road project in Winston County for $66,616.

F. S. Neely of Amory has a grading contract on 2.7-miles of roadway in Lowndos County for $38,353.

Wisconsin Notes

Nolan Brothers, Inc. of Minneapolis are working on a relocation job for Highway 35 between Prairie Du Chien and Lynxville. Approximately 400,000 yards of excavation are involved on the 7¼-mile section with 90,000 yards of it solid rock. Chris Olson, superintendent, has plenty of equipment on the job and is making good time. He is working two 1½-yard Northwest shovels, one 1¼-yard Koehring shovel,

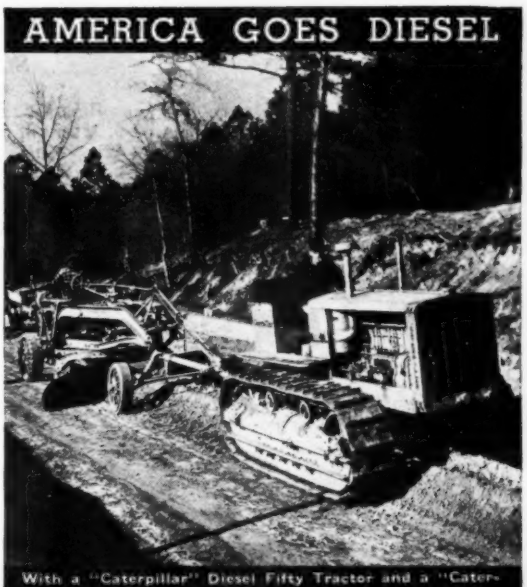
six Caterpillar Sixties, six Athey trailers, four 4-yard Koehring Dumptors. A Gardner Denver air compressor furnishes air for two rock drills. DuPont explosives are used.

The photograph shows one of the Northwest shovels loading a large rock into an Athey trailer.

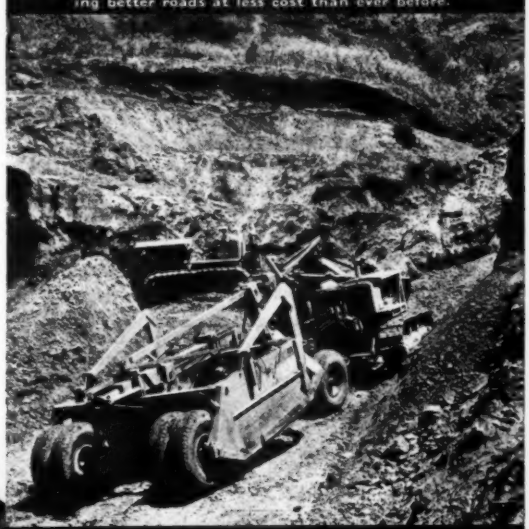
"THE 'CATERPILLAR' DIESEL SAVES US $123.50 PER MONTH ON FUEL"

—SAYS MR. A. T. LOCK OF BORGER, TEXAS. HE ADDS: "— BESIDES, IT PULLS A MUCH HEAVIER LOAD THAN OUR FORMER GASOLINE TRACTOR."

Less cost—more work accomplished—such results explain the rapidity with which America is going Diesel with "Caterpillar." Power users long hoped for lower fuel cost—"Caterpillar" Diesel has brought it to them, together with simplicity of design, ease of operation and maintenance, sturdy dependability. A full-Diesel type engine, with individual interchangeable fuel injection pumps and valves, and an all-weather sure-starting system. Ask the address of an owner—now nearly 4000 of them—from whom you can learn, first hand, why and how the "Caterpillar" Diesel leads the field. Caterpillar Tractor Co., Peoria, Illinois, U. S. A.



With a "Caterpillar" Diesel Fifty Tractor and a "Caterpillar" Road Grader, Bibb County, Georgia, is today building better roads at less cost than ever before.



Four "Caterpillar" Diesel Tractors serve the McKinley Company, one of the contractors building the Oakland, Calif., low-level tunnel road. Work goes on twenty-four hours a day.

Pushing a bulldozer, this "Caterpillar" Diesel Tractor lowers cost for the Dick Company on its contract near Audenried, Penna.

For your convenience in writing to Caterpillar Tractor Co., you will find a card bound in this issue.

Shots From the Firing Line—
Continued

Operator **Edward J. Michal** of Eau Claire sent us these snapshots of a model of a 50-B Bucyrus-Erie shovel and dragline which he made at home as a hobby. The model surely looks

like the real thing, doesn't it? He tells us he is running a Bucyrus-Erie 42-B for **Merritt, Chapman and Whitney** near Fountain City where they are building Dam No. 5.

St. Louis and Vicinity

By A. J. KOENIG

An ordinance providing $305,000 was passed by the Board of Aldermen, for the **construction of a viaduct** across Manchester avenue, the Mo. Pac. and Frisco railroad tracks. Bids will be asked for at an early date.

Bids for the construction of **120 miles of roadway** were received Sept. 8th by the Missouri State Highway Commission. The letting included contracts for the building of 17.7 miles concrete paving, 14.2 miles gravel, 19.1 miles graded earth, 15.6 miles bituminous mat, and 43 miles of oiling, the total amount of the letting being $1,390,400.

The Davis Construction Co. of Boonville, with a bid of $325,000 was low on the 40-ft. widening project seven miles long on U. S. 61 in Jefferson County.

Edward Eiff Co. of Quincy has contract for .16 mile 42 and 54-ft. pavement and 0.39-mile 14-ft. asphalt on concrete base in Adams County, Ill.

Contract for 2.05 miles concrete pavement in Macoupin County was awarded to **Moore & Kseidke** on their bid $45,026.

Simmons & Ferman, LaPlata, Mo., has a team outfit, elevating graders and other road machinery that is idle and would like to sublet some work.

● Largest List of Used Equipment appearing in any Trade Paper in the Field

For Used Equipment
see
Excavating Engineer

For Sale and Bargain Counter Section
(Pages 486-487 and 489-492)

River Notes

St. Paul District

By A. J. KOENIG

Bids for the **construction of Dam No. 6,** Mississippi River near Trempealeau, Wis., will be opened by the U. S. Engineers Office, October 2nd.

Rock Island District

The U. S. Engineers will receive bids October 24 for the construction of a **levee, drainage ditch, and roadway** at Lock and Dam No. 20 near Canton, Mo. The principal items of work are 487,500 yards of common excavation, 38,000 yards of rock, 395,000 yards of backfill, 1,000 yards of riprap, and 1,000 yards of concrete.

St. Louis District

By A. J. KOENIG

Bids will be asked for in October for the construction of **two additional dams** of the Mississippi River nine-foot channel project. One dam will be located at Guttenberg and the other near Muscatine, Iowa. The cost is estimated at $2,000,000 each.

Memphis District

At a letting held August 28, at which bids on approximately 3,710,000 yards of levee were taken, the following contractors were low: **Forcum-James Company** of Dyersburg, Tenn., 16.5c per yard on 300,000 yards in the Little River Drainage Levee and 18.5c per yard on 325,000 yards in the Reelfoot Levee; **Edward E. Morgan Company Inc.,** of Jackson, Miss., 23.4c per yard on 640,000 yards in the Cairo Drainage Levee; **Brooks-Calloway Company** of Atlanta, 15.5c (average) per yard on 1,660,000 yards (four sections) in the Lower St. Francis Levee; and **Driver Company** of Memphis, 13.8c on 785,000 yards, in the same levee.

At a letting held August 31, **C. W. Greeson** of Baton Rouge was low with a bid of 16.74c on three sections of levee involving approximately 1,230,000 yards. The other three sections totaling 1,490,000 yards went to **Clarke Brothers Construction Company** of Clinton, Iowa for 15.47c per yard.

All bids received September 12 for constructing the 123,400-yard Mound City (Ill.) levee were rejected.

Vicksburg District

Sternberg Dredging Company of St. Louis was awarded approximately 1,708,300 yards of levee work on its bid of 13.5 cents August 23. The work is located 8 miles south of Fitler, Miss., on the east bank of the river.

Hardwick & Horton of Memphis bid 16.3c per yard on 556,000 yards of levee work August 23. The job is located about 5 miles north of Mounds, La. on the west bank.

At a letting held September 14, **Louisiana Materials Company** of Baton Rouge was low on 139,000 yards of levee work with a price of 9.2c; **J. C. Leathers** of Alexandria was low on 40,000 yards at 33c; and **Boone & Webster Inc.** of Monroe were low on 36,300 yards at 19.6c.

New Orleans District

At a letting held September 4, **Atlas Construction Company** of Dallas was low with a bid of 17.42c on seven items of the Courtableau-Henderson Levee totaling 1,570,000 yards and 13.94c on the two items of the Ramah-Grand River Levee involving 1,050,000 yards. On the remaining six items of the first named levee amounting to 1,630,000 yards, **McWilliams Dredging Company** of New Orleans made the successful bid of 43c.

Brooks-Calloway Company of Atlanta was low bidder September 11 on the Melville Ring Levee of 2,810,000 yards. The unit price averaged 12.8c.

C. I. Jones of Baton Rouge was low bidder September 11 on 1,010,000 yards in the East Atchafalaya Basin Protection Levee with a figure of 23.45c per yard. The second item of 1,250,000 is to be readvertised. On the third item of 980,000 yards, **Jahncke Corp.** of New Orleans submitted the low bid of 37.75c.

Bids will be received October 9 on **1,260,000 yards of levee.** The work is located along the west side of the Plaquemine Branch of the Intercoastal Waterway in Iberia Parish, La.

Bids will be taken October 12 on **2,800,000 yards of levee** located in the East Atchafalaya Basin Protection Levee.

Kansas City District

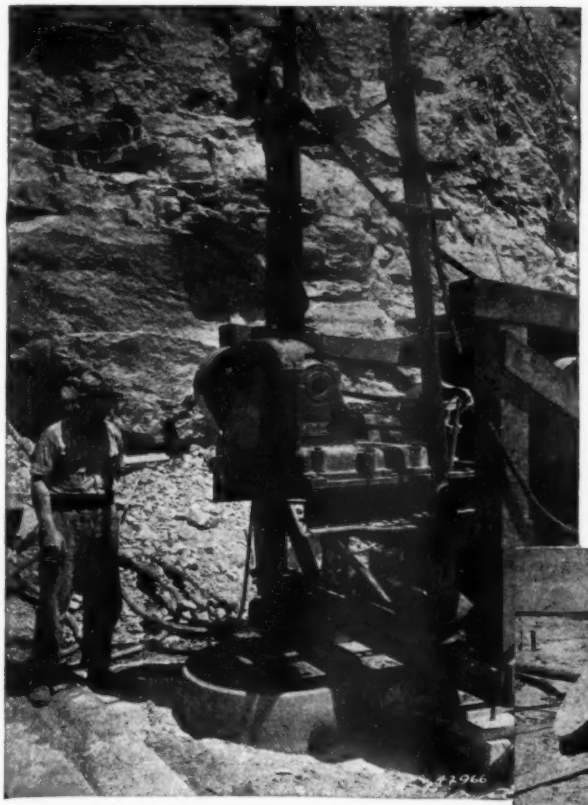
U. S. Engineers announced the following awards on August 17 bids; **Kansas City Bridge Company** of Kansas City, dikes in Missouri River at Bellevue Reach for $447,023 and dikes and revetments at St. Mary's and Plattsmouth Bends for $1,181,252; and **Paton Tully Transportation Company** of Memphis, dikes and revetments near Bellevue Reach for $734,052.

C. F. Lytle of Sioux City, Iowa, was low bidder August 20 with a figure of $209,277 for the construction of 3,100 linear feet of standard pile dikes and 6,200 feet of revetment in the Missouri River at Blair Bend.

George W. Condon, Cunningham & Cole Company of Omaha, was low the same day, bidding $232,787 for the construction of 2,300 feet of pile dikes and 5,250 feet of revetments at Decatur Bend.

On August 21, **Kansas City Dredge Company** of Kansas City was low with a bid of $182,911 on 6,500 feet of pile dikes at Langdon Bend; and **Massman Construction Company** of Kansas City was low bidder on 11,900 feet of pile dikes, 500 feet of crib dikes, and 1,000

POSITIVE CHECK of DAM FOUNDATIONS



Ingersoll-Rand Class WS "Calyx" core drill extracting 36-inch core at Norris Dam site. This machine has averaged 10 inches of core per hour. The other picture shows cores extracted from a 45-foot hole.

IN order to check the preliminary test borings at the site of Norris Dam, a number of 36-inch diameter holes were drilled by an Ingersoll-Rand "Calyx" core drill to permit direct visual inspection of the rock on which the structure will rest. These holes were as much as 52 feet deep and enabled Dr. Charles P. Berkey, consulting geologist, and all members of the consulting engineering board to be lowered into them to examine every inch of the walls.

The cores furnished a complete record of the formation penetrated and supplemented the underground observations. This is believed to be the first time that cored openings large enough for a man to enter have been systematically made in a dam foundation. This method furnishes an effective, positive means for checking results of earlier core drilling.

The cost of such work is insignificant compared with the total investment in a large-size dam.

Birmingham
Boston
Buffalo
Butte
Chicago
Cleveland
Dallas
Detroit
Denver
Duluth
El Paso
Honolulu
Knoxville
Los Angeles

84-5

Ingersoll-Rand

11 Broadway, New York City

Manila
Newark
New Orleans
Philadelphia
Picher
Pittsburgh
San Francisco
Salt Lake City
Scranton
Seattle
St. Louis
St. Paul
Tulsa
Washington

For your convenience in writing to Ingersoll-Rand, you will find a card bound in this issue.

Shots From the Firing Line— *Continued*

feet of revetment at Hamburg and Barney Bends with a figure of $346,780.

Woods Brothers Construction Company of Lincoln, Neb., was low bidder Aug. 22 on 1,100 feet of pile dikes and 1,570 feet of revetment near Liberty Bend. The bid price was $66,492.

On August 23 the **Massman Construction Company** of Kansas City submitted low bid of $205,672 on 6,745 feet of pile dikes near DeWitt and Glasgow Bends; $130,581 on 4,570 feet of pile dikes between Providence and Eureka Bends; and $84,591 on 2,870 feet of pile dikes near Isbell Reach.

Bower & Peters, Inc., of St. Louis, was low with a bid of $190,033 on 5,460 feet of pile dikes and 2,100 feet of revetment between Rocheport and Lupus Reach.

On August 24, **Woods Brothers Construction Company** was low with a bid of $85,631 on 3,000 feet of pile dikes between Rushville and McQueen Bends. **John Spitcaufsky** of Kansas City was low on the Weston Bend job, 2,350 feet of pile dikes for $65,595.

Kansas City Bridge Company was low September 8 with a quotation of $219,725 on 2,300 feet of pile dikes and 5,250 feet of revetment at Decatur Bend.

Missouri Notes

The City of Washington opened bids September 7 for the construction of a new bridge over the Missouri River. **The Missouri Valley Bridge & Iron Company** of Leavenworth, Kansas, was low on the substructure with a figure of $212,000. **McClintic-Marshall Corporation** of St. Louis submitted low bid of $336,000 on the superstructure.

The City of Hannibal, let contracts for the construction of a bridge across the Mississippi River. **Union Bridge & Const. Co.** was awarded contract for the substructure on their bid of $228,438. The contract for the superstructure went to **Mount Vernon Bridge Co.**, their bid being $362,836.

Arkansas Notes

Kochtitzky & Johnson of Forrest City have a contract to build the Donaldson overpass in Hot Spring County for $55,493 and a bridge in Little River-Sevier Counties for $65,394.

Ben Hogan of Little Rock was awarded a 2.5-mile grading and surfacing project in Lee County for $40,259.

Texas Notes

The War Department has widened about 18 miles of the Galveston Bay Channel from 230 feet to 400 feet and deepened it from 30 to 35 feet with PWA funds made available in September 1933. Additional funds having been made available by the Federal Government for the further improvement of the Houston Ship Channel, bids for the deepening to a depth of 34 feet from a point 4,000 feet above Baytown to the Turning Basin, a distance of 20¼ miles, will be **opened on October 10th** by the United States District Engineer, Col. E. H. Marks, in charge of the Texas District. It is expected that dredges will be placed on the project during November, at which time the work will be rushed to completion.

The Lone Star Cement Company, located on the Houston Ship Channel, employing about 200 men and using oyster shell for their lime aggregate, has just celebrated the third consecutive year of operation without a single accident causing loss of time to an employee. The Safety Trophy awarded two years ago was rededicated with appropriated ceremonies attended by high officials of the company, Mayor, County Judge, City and County Commissioners, Port Commissioners and industrial leaders. A barbecue lunch was served at the conclusion of the exercises.

Dodds & Wedegartner and **James & Littrell** of San Benito submitted low bid of $288,000 for the construction of a 12,000- foot pile trestle bridge across Laguna Madre from Port Isabel to Padre Island.

W. C. Cobb, Waco, Auditor of McLennan County, received low bids Sept. 4 on 8.394 miles grading and drain

CUT WINTER DEPRECIATION MAINTENANCE COST LUBRICATION EXPENSE

WITH GREDAG LUBRICANTS

Adopt these grades on equipment exposed to low temperatures . . .

Grade 16 —For cables and open gears. A soft, very adhesive lubricant. Does not harden, crack or peel.

Grade 20 —For chain and enclosed gear drives, automotive transmissions and differentials, plain bearings and car journals. Fluid. Retains lubricating value at very low temperatures.

Grade 41 —For a wide range of medium and heavy duty enclosed gear applications, worm drives and elevator guides. Fluid.

Grade 51½-For ball and roller bearings, chassis bearings, automatic grease cups and pressure fittings. As soft a lubricant as can be made with cup grease characteristics.

NATIONAL CARBON COMPANY, INC.
Carbon Sales Division, Cleveland, Ohio
Unit of Union Carbide UCC and Carbon Corporation
Branch Sales Offices:
New York • Pittsburgh • Chicago • San Francisco

Pushes, pulls, works with sky hooks, chain, pipe —thousands of uses. Built to last a lifetime

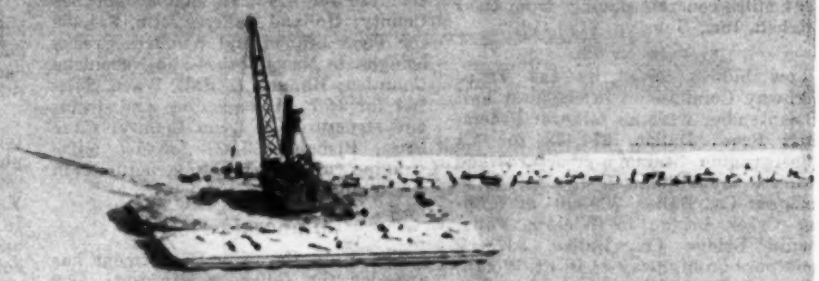
CUT *repair* COSTS!

ON EVERY JOB where a tight hold, a steady push or a heavy lift is needed, a Beco Jack will do it better. You cannot in one day, visualize all of the jobs the Beco Jack can do handily.

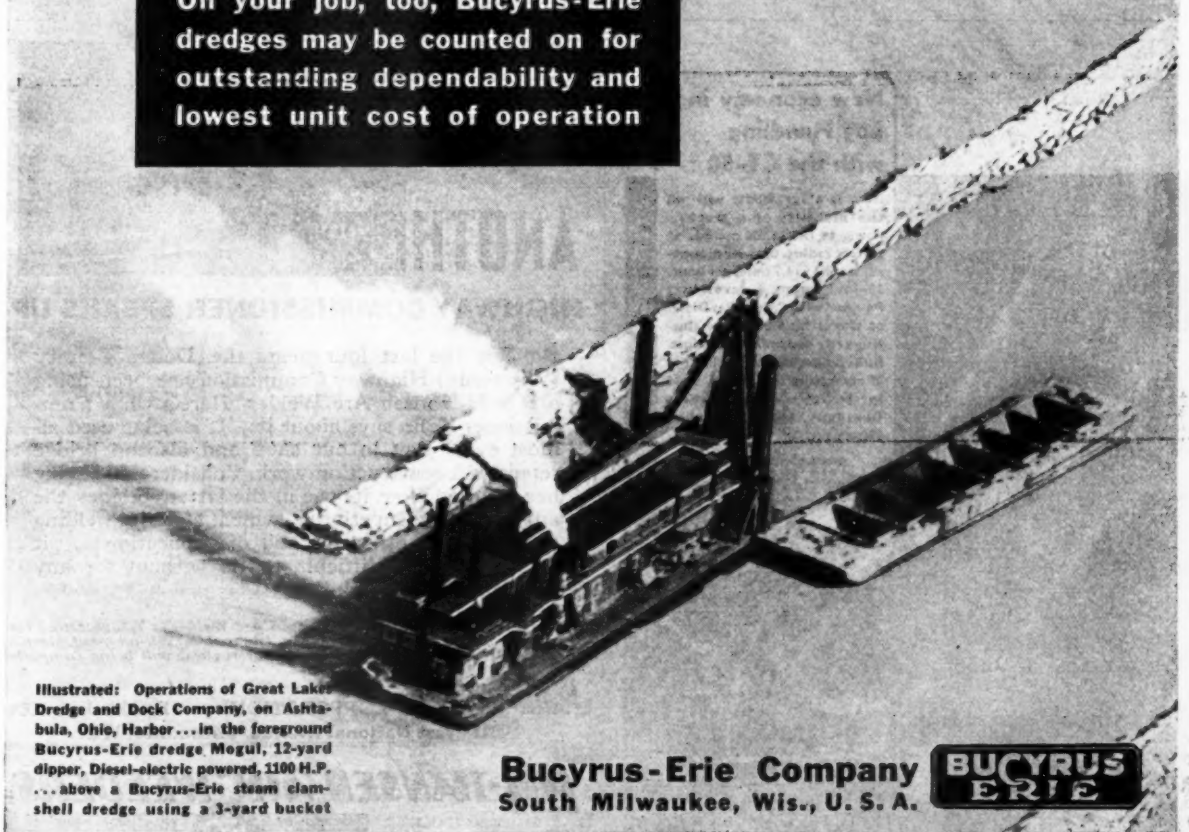
Write for complete information—no obligation.

BUCYRUS-ERIE COMPANY
Specialty Department
SOUTH MILWAUKEE WISCONSIN

FOR SUBMARINE EXCAVATION



ON the harbor works at Ashtabula these Bucyrus-Erie dredges delighted their owners with their excellent performance. On your job, too, Bucyrus-Erie dredges may be counted on for outstanding dependability and lowest unit cost of operation



Illustrated: Operations of Great Lakes Dredge and Dock Company, on Ashtabula, Ohio, Harbor... in the foreground Bucyrus-Erie dredge Mogul, 12-yard dipper, Diesel-electric powered, 1100 H.P. ...above a Bucyrus-Erie steam clamshell dredge using a 3-yard bucket

Bucyrus-Erie Company
South Milwaukee, Wis., U. S. A.

BUCYRUS ERIE

BUCYRUS-ERIE DREDGES

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

Shots From the Firing Line—

Continued

structures from **F. Hall**, Waco, $57,951; 8.394 miles concrete paving, from **Russ Mitchell, Inc.**, Houston, $132,410.

By L. W. GABEL

Low bids received by the Texas Highway Commission in the first half of September were as follows: **Froeming Bros.**, Dallas, $74,448 for 1.1 miles grading, drainage structures and concrete in Williamson county; **C. S. Constant Co.**, Dallas, $22 119 for Holliday Creek bridge in Wichita Falls; **Austin Bridge Co.**, Dallas, $37,041, underpass on highway 34 in Ft. Worth; **Brown & Root, Inc.**, Austin $418,973, 25.1 miles of limestone, asphalt surfacing, stone base, in Bexar and Kendall Counties; **Combs & Glade**, Wichita Falls, $164,311, for 2.9 miles grading, drainage structures and concrete, in Wichita Falls; **John W. Abbott Construction Co.**, Fort Worth, $8,768, storm and sanitary sewers in Wichita Falls; **Allhands & Davis**, Dallas, $38,930 for 5.2 miles grading and drainage structures in San Saba County; **L. D. Parks**, Fort Worth, $13,015 for Buffalo Creek bridge in San Saba County; **H. B. Zachry**, Laredo, $47,871, eight miles gravel base and single bituminous surfacing in Travis County; **Ernest Lloyd**, Forth Worth, $173,558 for 15.4 miles base course in Houston County; **Buckner Bros.**, Cleburne, $83,424, for Angelina River bridge and relief bridges in Cherokee and Nacogdoches Counties; **J. S. Moore & Sons**, nine miles drainage and grading and 1.1 miles concrete for $143,290, in Nacogdoches County; **Holland Page**, Austin, $24,459 for Tiger branch and Wanders Creeks bridges, in Nacogdoches and Naconiche Counties; **Hannah & Hall**, Waco, $31,744 for 15.7 miles grading and drainage structures in Lynn County; **Cage Bros.**, Bishop, $35,827 for 1.7 miles grading and drainage structures in Bexar and Comal Counties.

Minnesota Notes

The State Highway Department has awarded the following contracts: 2.2 miles concrete paving on Route 2 and 212 to **Hallett Construction Co.**, Crosby, for $143,708; 12.6 miles concrete paving to **Anderson & Sons** of Minneapolis for $275,791; 3.2 miles paving to **J. S McLaughlin**, Mankato, for $77,377; 8.8 miles paving to **Woodrich Construction Co.**, Minneapolis for $178,977; 4.3 miles paving to **Nelson, Mullin, & Nelson**, Minneapolis, for $109,654; 6.2 miles paving to **Hanlon & Okes** of St. Paul, for $155,256; 5 miles paving to **S. J. Reader** of Minneapolis for $99,866; 15.8 miles road surfacing to **P. C. Roth** of Brainerd for $73,534; 15.6 miles surfacing Route 28 to **Thornton Brothers** of St. Paul for $59,817; 1.9 miles grading to **Griffis Brothers** of Minneapolis for $36,624; and bridge on Route 16 to **M. E. Souther, Inc.**, and **C. C. Pagenhart** of St. Paul, for $44,164.

Fort Peck Dam Notes

J. L. Shiely Company of St. Paul, submitted low bid August 30 to furnish 260,000 yards of coarse aggregate for 64c per yard and 235,000 tons of sand for 40c per ton F.O.B. Cole, Montana.

Final shipment of the induction motors for the dredge pump and booster pump drives on the Fort Peck Dam project was recently made by **General Electric Company**, Schenectady, N. Y. In all, 42 carloads of electric motors and control equipment were required to complete the entire order. The pump motors are rated at 2500 h.p., 6600 volts, 60 cycles, 3 phase, 257 r.p.m. There will be two on each of four dredges, two on each of four floating booster stations, and one in each of four land booster stations. The order included five 700-h.p. enclosed, externally-force-ventilated, water-proof induction motors for driving the dredge cutters and five 150-hp. induction motors for driving the winches.

The booster stations are designed to pump a mud-and-water mixture from the dredges, operating at various locations in the Missouri River bed, through several miles of pipe line to the site of the dam. This mixture will form the hydraulically earth-filled core of the dam which, when completed, will con-

New economy in
Log Handling
with the CT-50
Here is a log loader with all the mobility of a tractor. Power to lift 13,900 pounds at 12-foot radius. Crawler mounted, travels to 4.7 miles per hour. 30-foot boom, ¾ revolving. Powered with Caterpillar Diesel or Gasoline 63 H. P. engine. Rugged, dependable, flexible. Built by world's largest builder of excavating equipment. Send for bulletin. Bucyrus-Erie Company, South Milwaukee, Wisconsin.
BUCYRUS ERIE
628

ANOTHER

HIGHWAY COMMISSIONER SPEAKS UP

● For the last four years the Dodge County (Wisconsin) Highway Commission has been using a P & H-Hansen Arc Welder. Here's what Commissioner Kohn says about it: "It is being used almost every day in our shop and also on bridge repair and construction work. Considerable saving has resulted from its use in the latter, besides the advantage of superiority which electric welding has over any other method of connection . . . it would be very difficult to do without for any kind of welding work."

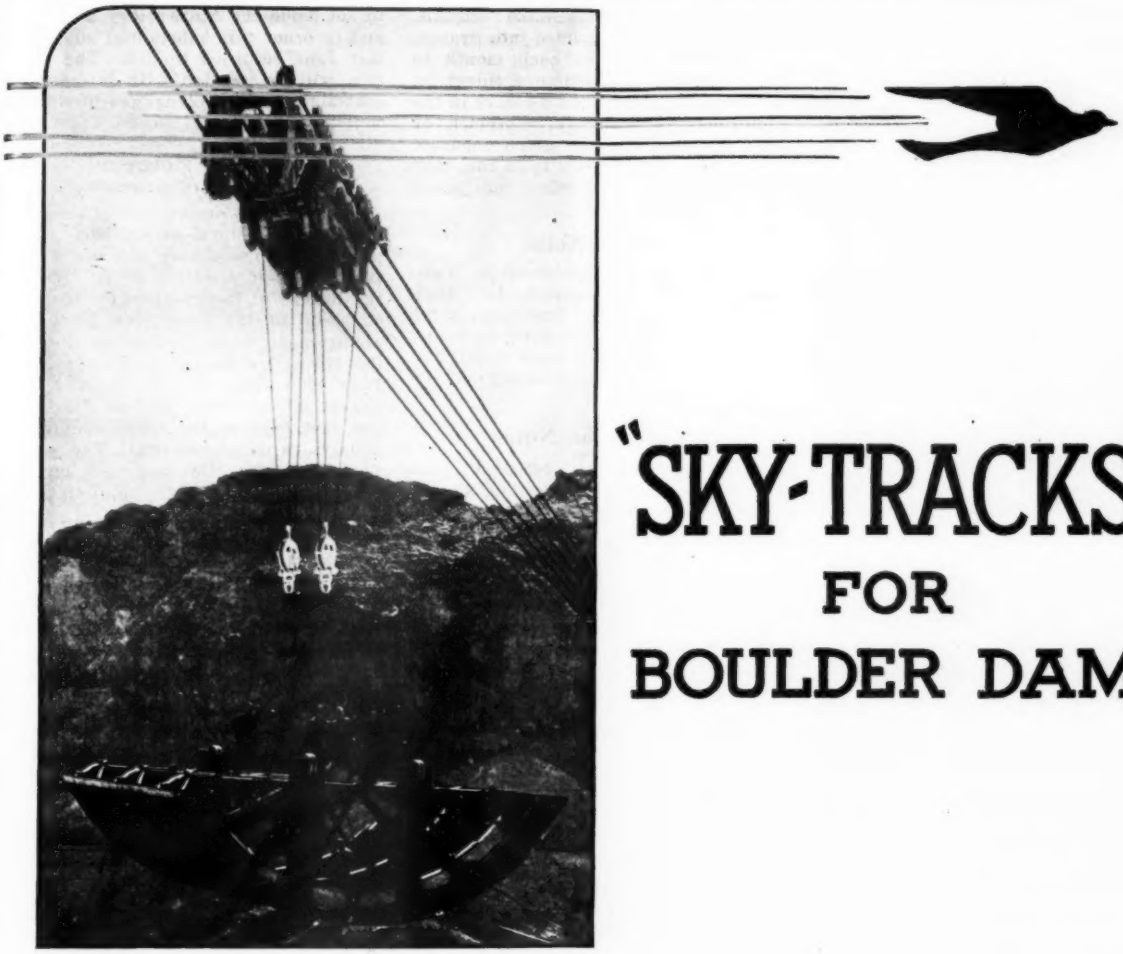
You, too, will find the P & H-Hansen Arc Welder a valuable tool for construction and maintenance jobs. It's mobile, self-powered, simple to operate, wide in welding range. Your request will bring complete information.

HARNISCHFEGER CORPORATION - Established 1884
4517 West National Avenue, Milwaukee, Wis.

P&H-HANSEN ARC WELDERS
BACKED BY 50 YEARS OF EXPERIENCE

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

THE AIR ROADS ARE ALWAYS OPEN



"SKY-TRACKS" FOR BOULDER DAM

The World's Heaviest Duty Permanent Cableway—150 Ton Capacity

HIGH above the Black Canyon of the Colorado River man has stretched a slender web of steel—built "Sky-Tracks" across the abyss that for centuries seemed impassable. The Lidgerwood Cableways—essential to the completion of Boulder Dam—represent spans of from 1365 to 2575 feet. To assure maximum service and economy—they are equipped with American Steel & Wire Company Track Cables. With breaking strengths in excess of 500 tons each—they enable safe and rapid movement of materials and supplies. In connection with your own aerial transportation problem—whether it be large or small—you will find American Steel & Wire Company quality and service of exceptional value. We invite you to correspond with us.

1831

1934

AMERICAN STEEL & WIRE COMPANY

208 South La Salle Street, Chicago
94 Grove Street, Worcester

SUBSIDIARY OF UNITED STATES STEEL CORPORATION
AND ALL PRINCIPAL CITIES

Empire State Building, New York
First National Bank Building, Baltimore

Pacific Coast Distributors: Columbia Steel Company, Russ Bldg., San Francisco

Export Distributors: United States Steel Products Company, New York

For your convenience in writing to American Steel & Wire Company, you will find a card bound in this issue.

Shots From the Firing Line—
Continued

tain 68,000,000 yards of material—or approximately 80,000,000 tons. The four dredges, exclusive of their associated boosters, will be the most powerful suction dredges ever built. The twenty 28-inch dredge pumps, four ladders and cutters were built by **Bucyrus-Erie Company**, South Milwaukee, Wisconsin. The upper of the two photographs below shows the pump ma-

chinery being assembled on one of the dredges. The lower view shows the workmen maneuvering one of the 264,000-pound digging ladders into position for attaching to the dredge.

South Dakota Notes
By LISLE REESE

The Homestake Mining Company of Lead has just completed the installation of a new $250,000 stamp mill addition which will increase the capacity of the south mill by 1,900 tons of ore per 24 hours, giving that mill a total capacity of 3000 tons. The stamp mill has 60 new stamps, three 6x12-foot rod mills, two Dorr bowl classifiers, two 5x14-foot ball mills, five Dorr classifiers, five amalgamators and three dewatering cones.

A new safety contest has been started by the Homestake officials. With the workmen divided into groups, awards will be given each month to those without a lost-time accident on the condition there are no others in the group having accidents. Foremen or shift bosses are to be given separate cash prizes. The contest is to run until next Labor Day, 1935, when final prizes will be distributed.

Oregon Notes

The Bureau of Reclamation, Vale, has awarded a contract to **Haas, Doughty & Jones**, San Francisco, in the amount of $65,204 for earthwork and structures on the Vale main canal. The project involves approximately 551,000 yards of excavation.

Washington Notes

D. Nygren of Seattle received award to construct two bridges in Pacific County on Route 12 for $44,833.

Dolph Jones has a contract to build a single span concrete bridge 150 feet long in Pierce County for $35,911.

On September 12 the Director of Highways awarded the following contracts: 8.4 miles concrete paving in Kittitas County to **Albertson & Cornell Bros. Inc.**, of Tacoma for $229,565; 7.7-mile surfacing project in Kittitas County to **Fred G. Redmon** of Yakima for $34,809; and 1.5-mile paving project in Pacific County to **Graham Brothers & Medley** of Chiholis for $55,738.

Grand Coulee Dam Notes
By C. M. LITTLEJOHN

Engaged upon an extensive excavation project in connection with this $63,000,000 dam, **David H. Ryan**, well-known contractor from San Diego, Cal., claims exemption from a tax levy, by the State of Washington, amounting to $4,012, which he was forced to pay the tax commission.

A nice legal point is involved, one concerning the jurisdiction of the state and its right to levy on a contractor who is working under contract with the United States government, and upon Federal land.

Mr. Ryan seeks redress through an appeal filed in the Superior Court at Olympia, wherein he asks this tribunal to set aside the State's levy as illegal and to order this substantial sum paid last June returned to him. The decision will be awaited with interest by contractors who are engaged in similar contracts on Federal works.

Utah Notes
By H. L. LIVINGSTON

The Utah Construction Company, Ogden, and **Morrison-Knudsen Company**, Boise, Idaho were awarded a contract on their joint bid of $677,898 to the Bureau of Reclamation for the construction of the Pine View Dam and appurtenant works located on the Ogden River, 7 miles north of Ogden. The Pine View Dam will be an earth and gravel fill structure 75 feet high and 500 feet long at the crest, containing 250,000 yards of material. The reservoir, formed by the dam, will have a storage capacity of approximately 38,000 acre-feet.

W. W. Clyde & Company of Springville was awarded a contract to surface 11 miles of roadway in Carbon-Wasatch Counties for $78,584 and 8.6 miles in Kane County for $30,218. In addition the company was awarded a 20-mile road project in Washington County for $157,537.

A 15-mile road job in Garfield County was awarded to **Reynolds Ely Company** of Springville and **O. Nelson** of Logan for $124,467.

J. C. Compton of McMinnville, Oregon, received award on a 28.5-mile road project in Sevier and Sanpete Counties for $98,782.

J. M. Sumsion of Springville has a 43-mile road job in Grant County at a figure of $168,000.

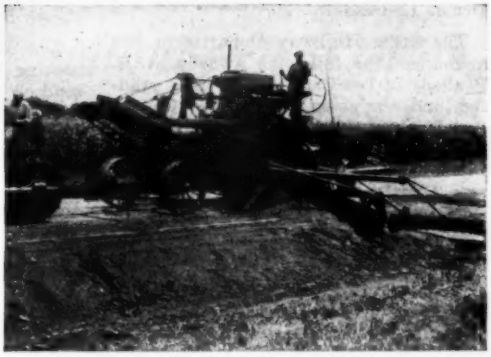
J. W. Whiting & Co. of Springville received award on a 10-mile project in Carbon County for $92,194.

The Bureau of Reclamation will receive bids **October 18** at its Salt Lake City office for the **construction of the Ephraim tunnel.** The principal items of its work are 1,800 yards of open-cut and 9,440 yards of tunnel excavation.

You don't know how economical
YELLOW STRAND
WIRE ROPE can really be until you try "Flex-Set" Preformed Yellow Strand on your excavating machinery. Made of tested, *selected* wire.
Get Catalog 51
BRODERICK & BASCOM ROPE CO.
ST. LOUIS
Seattle, Wash. Portland, Ore. Houston, Texas New York, N. Y.
Factories: St. Louis and Seattle
P-48

HAYWARD BUCKETS
A PROFIT ON EVERY JOB
USING Hayward Buckets exclusively is your best bet for making a profit on all digging and rehandling jobs.
THE HAYWARD COMPANY
52-54 Church Street
New York, N. Y.

GETTING THE DIRT *out* *when even* GETTING IN IS TOUGH



The Shouldering Attachment for the No. 6 Elevating Grader, illustrated above, is accurate and a big saver of time, labor and money.

● If all the earth that must be moved lay beside a broad, smooth highway Western Crawler Dump Wagons couldn't be sold at a nickel apiece, and the contractor would perhaps get the job at a nickel a yard. But on broken ground, the problem is to save every nickel possible, and come out with the dirt—and a profit. That's the Western Crawler Dump Wagon's job. In its unique spring wind-up alone, which does away with the man formerly needed to dump and wind-up, it saves labor and time to the tune of many nickels.

● Often used with these Crawler Wagons, the Western Elevating Grader, or the Austin Contractor's Special Elevating Grader, make an ideal combination for grading and hauling with the greatest economy. Send the coupon for details.

Casting with an Austin Contractor's Special Elevating Grader fitted with hydraulic controls.

The Austin-Western Road Machinery Co.
Home Office: Aurora, Ill. Cable Address: AWCO Aurora
Branches in Principal Cities

Austin-Western

ROAD ROLLERS, CRUSHING & SCREENING PLANTS, SCARIFIERS, SWEEPERS & SPRINKLERS, ROAD GRADERS, ELEVATING GRADERS, MOTOR GRADER DRAGS, SHOVELS, WAGONS

The Austin-Western Road Machinery Co.
Aurora C-9 Illinois.
Please send illustrated bulletins on:
☐ Western Crawler Dump Wagons
☐ Austin Contractor's Special
☐ Western No. 6 Elevating Grader
Name _____
Address _____
City _____ State _____

Cletrac Tractors
Sold and serviced in this territory by Austin-Western

When writing to The Austin-Western Road Machinery Co., please use coupon or card bound in this issue.

Shots From the Firing Line—*Continued*

New Mexico Notes

The State Highway Department has made the following awards: 12.5 miles of grading in Bernalillo-Valencia Counties for $159,671, 44 miles of surfacing in Harding-Colfax Counties for $124,199, and 23 miles of surfacing in Socorra County for $56,123 all to **Cook & Ransom** of Ottawa, Kansas; 1.1 miles of concrete pavement in Bernalillo County for $47,271 to **New Mexico Construction Company** of Albuquerque; 18.8 miles of surfacing in Dona Ana County for $47,891 to **Lee Moor Contracting Company** of El Paso; 27 miles of surfacing in Union County for $140,060 to **Armstrong & Armstrong** of Roswell; a road project in Tucumcari County for $132,881 to **E. W. Everly** of Albuquerque; and a grading and surfacing project for $95,939 to **George W. Orr** of El Paso.

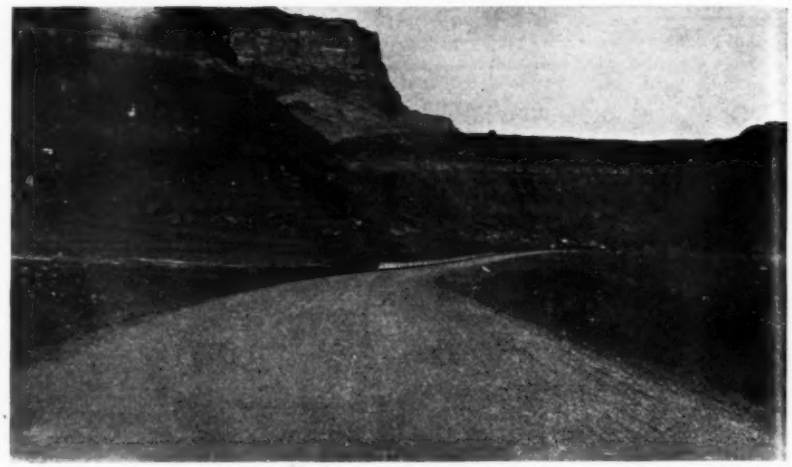
The State Highway Department has announced the following awards: **A. O. Peabody** of Las Cruces, 32.6 miles grading and surfacing in Hidalgo County for $63,149; **Hirchkof-Hanes, Inc.**, of Albuquerque, .7 miles grading and surfacing in Springer County for $56,219; and **Armstrong & Armstrong**, Roswell, 1.12 miles grading and surfacing for $35,646.

Arizona Notes

The Showlow-Silver Creek Water Conservation and Power District, Navajo County, Arizona, has been awarded a PWA **loan and grant of $148,000** to finance construction of an irrigation and hydro-electric power development. This work includes construction of a dam to impound 13,000 acre ft. of water, a hydro-electric power plant and 20 miles of canal.

By D. I. DAY

Hodgman & MacVicar and Royden have completed an 18.2-mile stretch of road beginning at the Navajo-Apache County line in the northeast part of the state. All who have enjoyed traveling in that scenic section, on U. S. 66, between Gallup, N. M., and Holbrook, Ariz., will derive a lot of pleasure out of this new road on their next venture into the ever-glamorous Southwest. A portion of the finished road is shown in the photograph above.



Lee Moor Contracting Company is making good progress on its 22-mile road project on U. S. 89 in the Prescott-Ashfork part of the state. This company is also working on another 9-mile job—grading, draining, placing base course and road mix on the same highway.

Near the Gillespie Dam Bridge on U. S. 80, the **Arizona Sand & Rock Company** is putting the finishing touches to about 5 miles of new highway. This work includes grading, draining, and surfacing by the road-mix method. In Apache County, some distance northwest of St. Johns, the **W. E. Hall Company** has a contract to grade, drain, and surface 7.4 miles. This work is going forward in good shape.

Close to the Mexican Border in southeastern Arizona, a few miles east of the city of Bisbee, the **William Peper Construction Company** and **Lee Frost** are going right along to a satisfactory completion on a short project—about a mile or a little less, of grading, draining, and concrete paving. The job included the widening and lengthening of a concrete arch bridge at that point. The work is on the old popular tourist trail—U. S. 80.

There are two highway construction jobs in the National forest area which deserve mention. One of these is the **Hodgman & MacVicar** contract which starts at Clint's Well and runs 8 miles northward through the National forest in the general direction of Flagstaff. Clint's Well is just a dot on the map between Pine and Winslow but when that part of Arizona is opened up by improved roads to year-around auto traffic, there will be a new wealth of fine Arizona scenery available to the motoring public. In northeastern Arizona near Kingman, **M. J. Bevanda** is busy on a 10.8-mile grading and draining project. This job starts near Boulder Dam and runs southward, and is a part of the plan to provide a good automobile road from Kingman to Boulder Dam. Kingman, with the exception of a few miles, is now connected by good roads with the towns in the Grand Canyon section. The time is just about here when the tourist can see the Grand Canyon and Boulder Dam on successive days.

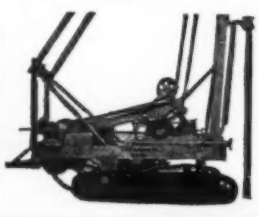
"Yes, my son, I'm a self-made man."

"That's what I admire about you. You always take the blame for everything."

MORE PROFIT

The New Loomis "CLIPPER" size 44 earns more profit because it speeds up the drilling job and saves many dollars by cutting the cost of maintenance.

The friction clutch operated full length crawlers, enable the operator to easily climb steep hills and shift the "Clipper" into any desirable position.



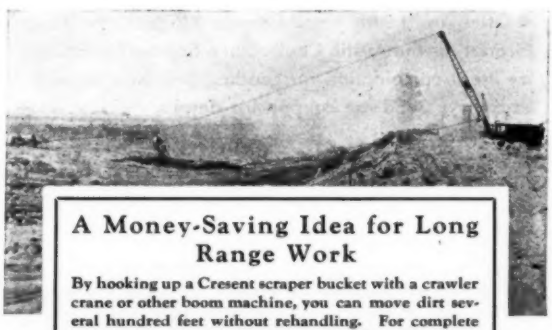
The New Loomis "CLIPPER" size 44 is equipped with steel frame, wooden or steel mast wire or Manila line.

Write for details

The **LOOMIS MACHINE COMPANY**

K Street Tiffin, Ohio

Established 1842



A Money-Saving Idea for Long Range Work

By hooking up a Cresent scraper bucket with a crawler crane or other boom machine, you can move dirt several hundred feet without rehandling. For complete explanation, write for the Sauerman Bulletin No. 140.

SAUERMAN BROS.

474 S. Clinton St. CHICAGO, ILL.

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

Ready NOW

• • • it tells you all about selecting the clutch

A VALUABLE SERVICE TO CLUTCH USERS

If you are an engineer, a designer or manufacturer of machinery, or in any way interested in the selection of a clutch for any specific purpose you will want this book. This new service to clutch users is an authoritative work, with complete information on clutch selection in readily usable form. When you want real clutch facts, it is a dependable guide that will save you time and trouble. Sent without cost or obligation to those requesting it. Address *Twin Disc Clutch Company, 1335 Racine Street, Racine, Wisconsin.*

TWIN DISC CLUTCHES

Better hang on to them - - - - - -

with the right set-up, these two cards will take the pot!

Knowing when to discard and when to "play 'em" is the secret of success in poker — and business, too. A Quarry Man would hang on to these two cards because so much profit is tied up with "Easier Removal" and "Giant Blasts." Cordeau-Bickford Detonating Fuse has made the giant blast practical and popular in quarry work. If your set-up permits one big shot in place of a lot of little ones, you too can use Cordeau to good advantage.

In any case you've got three good cards, certain: "Easier Loading" means a saving in time; "Less Hazard" means that you prime and load with an insensitive detonator; and "More Work From Explosives" means that in a Cordeau-detonated charge each cartridge has the added force of a primer cartridge.

Why not try a shot? — —

Safety Fuse and Lighters

Ensign-Bickford Safety Fuse is available in a number of standardized brands, each carefully made for a particular set of conditions. The use of Safety Fuse simplifies blasting technique.

Also — there are a number of Ensign-Bickford lighters, inexpensive — and positive in action.

Write for the Cordeau Book— it tells the full story of a new technique in blasting.

The Ensign-Bickford Co.
Simsbury, Conn. Estab. 1836

CORDEAU DETONATING FUSE BICKFORD

CB-35

Shots From the Firing Line— *Continued*

Nevada Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the Nevada Highway Commission: **Union Paving Company**, San Francisco, $46,909, for 3.44 miles grading and graveling in Lyon County; **George French**, Stockton, $62,365 for 16.61 miles of grading and graveling in Nye County; $22,404 for a road project in Lyon County; and $53,782 for a 22-mile road job in Clark and Nye Counties; **N. M. Ball**, Berkeley, $42,929 for concrete paving in the city of Elko, Elko County. He also received a contract to construct an overpass over the Southern Pacific Railway at Wells for $44,716.

Olaf Nelson of Logan, Utah received a road job in Lincoln County for $32,811.

Nevada Rock and Sand Company of Reno received a $65,685 road job in Mineral County.

Colorado River Aqueduct Notes

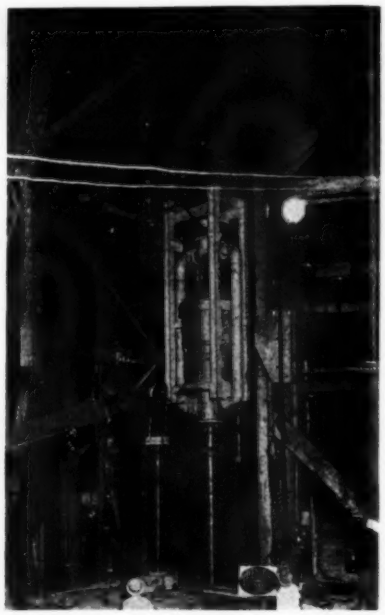
By K. CAMPBELL

Extensive preparations for shipping equipment from Boulder City, Nev. to the Parker Dam site are now under way by the **Six Companies Inc.**, following the award of a contract for the work by Secretary Ickes. First work to be undertaken in connection with the new dam will be the erection of a camp at Whipple, California, the new government town which has been established on the river bank. The next step will be the driving of two diversion tunnels, 29 feet in diameter, to by-pass the water around the work while the actual dam construction is under way. The river is now at a low stage and construction is being launched immediately to take advantage of the situation. Construction of a permanent road on the California side of the river, about 1800 feet in length, extending from a connection with the existing Aqueduct Highway to the crest of the dam, and 600-foot spur to the power house site is included in Schedule No. 1.

All tunnel records heretofore established on the Aqueduct were broken when **tunnel crews on the District force**, working on two headings out of Long Camp on the Coachella Division excavated 93 feet of hard rock tunnel during the 24-hour period ending midnight August 31. This same Division set another record when, working on 15 tunnel headings, the men drilled through 9,314 feet of hard rock during the month of August. Working from two headings, the crews from Berdoo camp drove 14,078 feet during the past twelve months through hard rock. B. C. Leadbetter is now Division Engineer for this District, replacing R. B. Diemer who has been transferred to the Los Angeles office.

Wenzel & Henock have driven through the bad bit of tunneling at Cabazon where swelling ground disturbed the 12x12 timbers so that they had to be replaced. At West Portal of the San Jacinto tunnel, this company is now using 12-ton capacity cars for carrying muck from shaft to dump. Here tunneling is progressing through the San Jacinto fault. It is expected that Wenzel & Henock will soon have the water lowered to the bottom of the shaft at Potrero as the large pumps, now in service, are unwatering the shaft at the rate of 3800 gallons per minute. They will soon be able to resume drilling operations which ceased July 1 when water broke in the east heading and flooded both legs of the bore and shaft to a depth of 647 feet.

Faced with a serious and most unusual problem when the water quickly filled the deep shaft Wenzel & Henock installed two 1200-gallon-per-minute deep well pumps. It was soon found that the inflow of water was greater than the capacity of the pumps. Subsequently the contractor obtained from the Peerless Pump Division of the Food Machinery Corporation of Los Angeles a unit capable of delivering 2600 G.P.M. against a total lift of 850 feet driven by a General Electric 700 H. P. vertical motor with hollow shaft. The manufacturer, to meet the emergency, made quick delivery and the pump was placed in operation August 13. This unit, according to the manufacturer, is the



world's largest deep well turbine pump as the total weight is approximately 100,000 pounds. As shown in the accompanying photograph the entire unit is suspended at the head of the shaft and is lowered by 20-foot stages as the water recedes.

Work on the Jackrabbit **Trail improvement** between Beaumont and Riverside is to be started at an early date. These improvements will cost between $450,000 and $500,000.

Dravo Construction Company is gradually recovering No. 3 East shaft at Valverde tunnel, after the cave-in four months ago. They are putting in a small drift and widening out from this, timbering as they go.

Power and maintenance crews have been busy repairing damage done to the Metropolitan Water District lines and roads by the recent storms. More rain fell during the past month (1.5 inches) than in the previous 12 months. So many boulders were washed down on to the roadways and tracks at

Time them . . . they're faster!

Multiple-Rope Dragline Power-Arm
Write for bulletins
The WELLMAN ENGINEERING CO.
7002 Central Ave., Cleveland, Ohio

MEETING PLACE OF CAPITAL AND LABOR
THE KOENIG LABOR AGENCIES
Established 1875
ST. LOUIS
612 Walnut Street
Main 2766 and 2767
KANSAS CITY
501 Delaware Street
Main 0796
HELP OF ALL KINDS FURNISHED FREE

For your convenience in writing to the advertisers on this page, you will find a card bound in this issue.

Whipple Mountain camp shown in the photograph, that **Walsh Construction Company** had to call part of their forces off tunnel drilling to aid in moving the huge rocks.

California Notes

By H. L. LIVINGSTON

The following contracts have been awarded by the California Division of Highways: **Mittry Bros. Construction Co.**, Los Angeles, $360,809 for 6.8 miles of grading and surfacing between Moreno and Beaumont in Riverside County; **Valley Paving Co.**, Fresno, $20,981 for .5 mile grading and surfacing in Merced County; **Daley Corporation**, San Diego, $23,415 for .3 mile grading and concrete paving in the city of San Diego; **Kovacevich & Price**, Southgate, $48,281 for .3 mile grading and paving in Los Angeles County.

The City of Eureka, California has voted bonds to finance improvements to the city water system. The amount of the bonds is $959,000 to which will be added a PWA load and grant of $1,168,000. The principal items of construction will be a concrete arch dam, 115′ high above streambed; 2300′ of tunnel which will be 9′ inside diameter and about 110,000′ of pipe ranging from 22″ down to 10″. Call for bids on this work will be issued about December 1934.

The U. S. Engineers Office, Sacramento, awarded a contract to **Kuhn Bros. and A. J. Callahan**, Manhattan Beach, California $62,828 for raising and strengthening levees along the southerly bank of the American River.

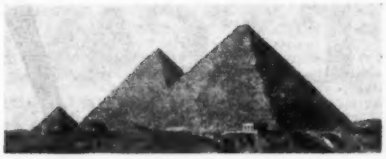
Southern California Notes

By K. CAMPBELL

Bids will soon be called for the **dredging of Newport Bay**, according to City Engineer R. L. Patterson. Work on extending the east and west jetties at the harbor entrance has been delayed by the recent high tides and the damage caused by them. Streets were flooded and several houses undermined and swept into the sea during this recent surge of high seas. About 322,000 tons of rock is being brought in from Catalina Island on barges. The west jetty of 2800 feet is to be extended 750 feet seaward; the east jetty was to be extended 950 feet. It is interesting to note that in the pounding waves, wooden pilings held firm at Newport, while cement piers sank five inches or more. It is believed that a distant storm, probably a Japanese typhoon, transmitted the impulses which set the waters in motion and the huge waves continued to oscillate in the pan formed by Catalina Island and the California Coast.

The Orange County Water District has dispatched a demand for a rehearing to Federal authorities, protesting the inclusion of the Jurupa reservoir site, on the Riverside narrows, as a proposed main dam in its $14,445,000 flood control and water conservation system, and asking instead for the substitution of the upper Prado dam site. The Directors of the District believe the latter will be of greater benefit to them.

Mittray Brothers Construction Company of Los Angeles expect to complete work on both the Sequoia-Grant's Park, and the Redwood Highway jobs in November. The Sequoia job included the building of 3½ miles of road at a cost of $225,000 between the two National Parks. The Redwood job included one mile of highway between Benbow and Garberville and seven miles of road north of Garberville at a cost of $400,000.



The men who built the Pyramids died like flies.

Thousands of slaves, building the ancient Pyramids, died like flies, transporting huge blocks of stone across deserts and up steep inclines. It took an army of men several decades to build the Great Pyramid said to contain 2,300,000 blocks each weighing about 3 tons. This difficult task was accomplished with the aid of crude ropes, levers and rollers. Compare this handling with present day methods. Surely, today's ways are a boon to man and industry.

TODAY you cannot compare the Bucyrus-Erie Rock Grab with ancient handling methods or any other grab you may have seen or heard about. This new unit will save time and expense on any job where large pieces of rock must be lifted. It operates safely, easily, simply... picking up, carrying and setting down heavy weights as easily as you would pick up a pencil. Find out about the Rock Grab. Users say it is indispensable. Five sizes — 2½, 5, 10, 15, and 20 Ton capacities.

838

Bucyrus-Erie Co., SPECIALTY DEPARTMENT SOUTH MILWAUKEE, WISCONSIN

For your convenience in writing to Bucyrus-Erie Company, you will find a card bound in this issue.

EXCAVATING ENGINEER Bargain Counter

★ ★ ★ **THE ITEMS LISTED on these pages have been selected because they offer unusual values to the man who is looking for a bargain. Some of this equipment is surplus stock which has never been used, some is rebuilt and carries new equipment guarantee, some is just plain used. But every item is priced for quick sale. If any of this equipment fits your needs send a postcard or letter, mentioning the reference number, to *Bargain Counter, Excavating Engineer, South Milwaukee, Wisconsin.* We'll pass your inquiry along to the owner and you will receive price and complete information promptly. Act now — with advancing prices on new stock this equipment will move fast.**

SHOVELS-CRANES DRAGLINES

P&H MODEL 208—45' BOOM DRAGLINE—Cats—15½' long, 9' wide, 22" Treads. 100 HP. Waukesha High Alt. Engine. SCD-1.

P&H MODEL 208—45' BOOM DRAGLINE—4-cylinder 7¾"x9" Twin City gasoline engine and 1½ cu. yd. Omaha bucket. SCD-20.

BUCYRUS-ERIE 30-B DIESEL 40' BOOM DRAGLINE. SCD-21.

MONIGHAN MODEL 1-W WALKER — 60' Boom Dragline, 1¼ cu. yd. Page Bucket. Good condition. SCD-13.

MEAD-MORRISON GASOLINE COMBINATION SHOVEL-CLAMSHELL. ½ cu. yd. Dipper, 17' Dipper handle—18' Boom—32' Clamshell Boom and 1½ yard Erie Clamshell Bucket. 5"x6" 4-cyl. Wisconsin Engine. Good mechanical condition. Bargain Price. SCD-28.

BAY CITY "PUP" GASOLINE CLAMSHELL. Good mechanical condition. SCD-24.

BYERS "BEARCAT" Gasoline ⅝-yard Shovel. Hercules engine. Overhauled. Good mechanical condition. SCD-25.

THEW-UNIVERSAL MODEL 35 — Gasoline — ½ cubic yard standard shovel equipment—25' lattice type crane boom and ½ yard Williams bucket with teeth—complete drag shovel attachment and skimmer scoop bucket, including home-made trailer. Excellent condition. SCD-26.

BUCYRUS-ERIE MODEL 30-B DIESEL SHOVEL—25 9" Boom, 14' Dipper Handle, 1 yd. Dipper. SCD-9.

KOEHRING MODEL 1—30' Boom Gasoline Crane. Cat Mounted—No Bucket—4½"x5" Wisconsin Engine. SCD-19.

GENERAL GASOLINE ½ CU. YD. SHOVEL—Buda 4-cyl. 4½"x6" Gasoline Engine. Only handled about 75,000 cu. yds. A-1 operating condition. SCD-27.

Shovel Equipment

¾ CU. YD. DIPPER—20' boom—13' Dipper Handle—rope crowd shovel equipment. Suitable for models 1030 or 1035—brand new. SE-1

¾ CU. YD. DIPPER—23' BOOM—15' DIPPER HANDLE—Extra High Lift Rope Crowd Shovel Equipment suitable for Models 1030 or 1035. Brand New. SE-2

COMPLETE FRONT END EQUIPMENT

¾ YARD PLATE DIPPER, 19'9" BOOM, 18'4" DIPPER HANDLE—Shovel equipment suitable application Bucyrus-Erie B or B-2. Good condition. SE-29.

¾ CU. YD. DIPPER—23' BOOM and ENGINE —12'6" DIPPER HANDLE—Shovel Equipment suitable for 20-B Steam. Brand New. SE-15.

¾ CU. YD. DIPPER—26' BOOM and ENGINE —17' DIPPER HANDLE — High Lift Shovel Equipment suitable for 30-B Steam. Brand New. SE-16.

¾ CU. YD. DIPPER—25'9" BOOM—14' DIPPER HANDLE—Shovel Equipment suitable for 30-B Diesel. Brand New. SE-17.

⅞ CU. YD. DIPPER—21'9" BOOM and ENGINE—15' DIPPER HANDLE — High Lift Shovel Equipment. Suitable for 31-B Steam. Brand New. SE-18.

1 CU. YD. DIPPER—20' BOOM—15' DIPPER HANDLE — Rope Crowd Shovel Equipment. suitable for Osgood "Conqueror." Good mechanical condition. Low Price. SE-24.

1 CU. YD. DIPPER—23' BOOM—12'6" Dipper Handle—Rope crowd shovel equipment. Suitable for D-2 machine. Brand new. SE-4

1 CU. YD. DIPPER—24' BOOM—18' DIPPER HANDLE—Slightly used but good conditioned. Suitable for any Bucyrus-Erie GA-2 or GA-3 Machine. SE-25.

1 CU. YD. DIPPER—24' BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-26

1¼ CU. YD. DIPPER—22'6" BOOM—16' DIPPER HANDLE—Rebuilt and Guaranteed. Suitable for application Bucyrus-Erie GA2 or GA3 Machines. SE-27

1¼ CU. YD. DIPPER—25' BOOM—17' DIPPER HANDLE—Slightly Used Rope Crowd High Lift Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-5.

1½ CU. YD. DIPPER—23'6" BOOM—15' DIPPER HANDLE—Slightly Used Rope Crowd Shovel Equipment suitable for Model 37-B. New Machine Guarantee. SE-6.

1½ CU. YD. DIPPER—27' BOOM—17' DIPPER HANDLE—High Lift Rope Crowd Shovel Equipment suitable only for Bucyrus-Erie 43-B machines. Rebuilt—New Machine Guarantee. SE-23.

Dragline Equipment

35' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-2.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on Model D-2. DL-3.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-6.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model E-2. Brand New. DL-7.

40' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For use on 30-B Diesel. Brand New. DL-8.

45' CHANNEL BOOM, FAIRLEAD AND ROPES, but not including bucket. For Model 30-B Diesel. Brand New. DL-9.

BRAND NEW Ropes included with each of above Dragline Equipments.

All of above equipment is BRAND NEW and of BUCYRUS-ERIE manufacture.

Skimmer Scoop

⅝ CU. YD. DIPPER—20' Boom together with all necessary ropes and material to completely convert Bucyrus-Erie 1020 Shovel, Clamshell or Dragline to Skimmer Scoop Machine. Brand New. Shipment 2 to 3 weeks. SS-1.

Trench Digging Equipment

1 CU. YD. 42½" WIDE—Solid type Dipper—24' Boom and all auxiliary equipment. Will dig maximum depth 22'. For application to GA-2 or GA-3 Shovel. Rebuilt—New Machine Guarantee. DS-5.

BRAND NEW PAGE. two dippers each ⅝ cu. yd., one 38" wide over cutters, the other 49½" wide over cutters. 17'1½" Boom and all necessary auxiliary equipment. Will fit Bucyrus-Erie 1030 or 1035. DS-7.

1-CU. YD. 42½" WIDE SOLID TYPE DIPPER—24' Boom and all auxiliary equipment—will dig maximum depth of 22'—For application to GA-2 or GA-3 Clam Shell or Drag Line. Rebuilt—New Machine Guarantee. DS-8.

BRAND NEW Ropes included with each of above Trench Digging Equipments.

DIPPERS

Small Machines

2 ⅝ CU. YD.—Plate.—Will fit 20-B Steam or Gas. Brand New. D-12

1 2/3 CU. YD.—Plate front.—Will fit 14-B. Brand New. D-13

1 ¾ CU. YD.—Rock Type.—Will fit 20-B Steam or Gas. Brand New. D-15

3 ¾ CU. YD.—Plate front.—Will fit 1030 or 1035. Brand New. D-16

2 ⅞ CU. YD. Plate front.—Will fit 1030 or 1035. Brand New. D-18

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Slightly used. D-36

1 ⅞ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 1030 or 1035. Brand New. D-37

1 ⅞ CU. YD.—Plate front.—Will fit 18-B. Brand New. D-20

1 ⅞ CU. YD.—Rock type. Will fit 31-B. Brand New. D-21

1 CUBIC YARD MANGANESE DIPPER. Will fit Bucyrus-Erie B-2 or GA-2. Good condition. D-40

2 1 CU. YD.—Cast Front Inserted Tooth Dippers. Rebuilt and Guaranteed. Suitable for application GA2 or GA3 Machines. D-34

1 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2, 41-B or 42-B. Slightly Used. D-26

2 1¼ CU. YD.—VAN PORT—ROCK TYPE. Will fit E-2. Brand New. D-27

1 1¼ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 37-B. Slightly used. D-38

1 1½ CU. YD.—PLATE. Will fit E-2. Brand New. D-28

1 1½ CU. YD. CAST FRONT INSERTED TOOTH DIPPER. Will fit 43-B. Slightly used. D-39

2 1½ CU. YD.—Manganese Front Inserted Tooth. Will fit E-2, 41-B or 42-B. Slightly used. D-29

1 1½ CU. YD.—Vanderhoef type with Vanderhoef teeth. Will fit E-2 or 42-B. Slightly Used. D-30

Large Machines

1 2½ CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on 68-C and 70-C machines. Brand New. D-1.

2 3 CU. YD.—Front 2½" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Can be used on Model 100-B, 68-C, 70-C Machines. Brand New. D-2.

1 3½ CU. YD.—Front 2¾" Nickel Chrome Steel, two part Van Port Reversible Teeth. Can be used on Model 88-C, 95-C, Class 180. Brand New. D-3.

1 4 CU. YD.—Front 2¾" Molybdenum Cast Steel, two part Van Port Reversible Teeth. Has seen some service but in good condition. Can be used on Model 100-C, 120-B. D-4.

1 4½ CU. YD.—Lip 2¼" Manganese Steel, two part Reversible Manganese Teeth. Can be used on Model 88-C, 110-C. Brand New. D-5.

3 6 CU. YD. Molybdenum Steel Front. Annealed Cast Steel Back, two part Reversible Van Port Teeth. Can be used on 225-B and 320-B. Brand New. D-11.

1 8 CU. YD.—Front Molybdenum Steel, two part Van Port Reversible Teeth. Can be used on Model 320-B. Slightly Used but excellent condition. D-6.

DRAGLINE BUCKETS

BRAND NEW

1 ⅝ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 890 lbs. DB-11

2 ¾ CU. YD. PAGE CLASS "C." Approximate weight each 2425 lbs. DB-1

1 1½ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 2900 pounds. DB-15

3 2 CU. YD. PAGE CLASS "C." Approximate weight each 5630 lbs. DB-4.

1 2¼ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3850 lbs. DB-13.

1 2½ CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 4600 lbs. DB-14.

REBUILT

1 2 CU. YD. BUCYRUS-ERIE TYPE "U". Approximate weight 3200 lbs. DB-12.

1 2½ CU. YD. BUCYRUS-ERIE INSERTED TOOTH. Approximate weight 6500 lbs. DB-9.

1 2½ CU. YD. OMAHA STANDARD. Approximate weight 5400 lbs. DB-10.

BOILERS

BRAND NEW

Will Make That Old Shovel Work Like New.

Can also be used for Miscellaneous Service

Vertical Type

1 44½"x88½" fitted with extended fire box for burning wood. Can be used for coal or coke. 37 H.P.—144 lb. Working Pressure. ASME Std. Can be installed on Type B Shovel. B-3.

1 44½"x88½"—37 H.P.—145 lb. Working Pressure—Canadian Standard. Will fit B or B-2. B-4.

1 46½"x88½"—37 H.P. 150 lb. Working Pressure. Massachusetts Standard. Will fit any B-2 or B-3 Machine. B-7.

3 46½"x110"—40 H.P.—155 lb. Working Pressure. Special Wood Burning Fire Box. ASME Std. Will fit any B-2 or B-3. B-9.

1 54"x100"—41 H.P.—125 lb. Working Pressure. ASME Std. Will fit B-2 or B-3. B-11

1 58"x7'9"—70 H.P.—150 lb. Working Pressure. Mass. Std. Will fit 42-B Machine. B-12.

Locomotive Type

3 44"x17'—75 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 68-C. B-13.

1 44"x18'—88 H.P.—125 lb. Working Pressure. ASME Std. Will fit Model 70-C. B-14.

2 54"x11'3"—92 H.P.—125 lb. Working Pressure. ASME and Mass. Std. Will fit Model 50-B Machine. B-16.

ELECTRICAL EQUIPMENT

MOTOR—GENERAL ELECTRIC—3 phase, 25 cycle, 550 volt, 1500 RPM., 90 HP., BRAND NEW. EE-1.

50 KW MOTOR GENERATOR SET—GENERAL ELECTRIC—consisting of 3 phase, 60 cycle, 440 volt, 1170 RPM., 75 HP., Induction Motor connected to 50 KW, 250 volt, 1200 RPM., Generator, including suitable rheostat and compensator. BRAND NEW. EE-2.

COMPENSATOR — GENERAL ELECTRIC—75 HP., 2220 volt, 3 phase, 25 cycle, manual type. BRAND NEW. EE-3.

TRANSFORMER—GENERAL ELECTRIC — 5-KVA. 2200-3810 volt primary, 440-220 volt secondary—3 phase, 60 cycle, with cast iron tank and cover, including specially fastened bushings to prevent oil leakage. BRAND NEW. EE-4.

GENERATOR — WESTINGHOUSE — 125 KW, 250 volts, 500 amperes. Direct Current. 440 RPM. Includes two outboard bearings. BRAND NEW. EE-5.

MOTORS (2) — GENERAL ELECTRIC — 21.5 H.P. 3 phase, 60 cycle, 440 volt, 900 RPM. Totally enclosed—ball bearing. BRAND NEW. EE-6.

AIR COMPRESSORS

1 BRAND NEW WORTHINGTON——METAL-WELD—2-cylinder 7"x6" Vertical 162 cu. ft. piston displacement, Air Compressor. Fitted with Laidlaw feather valves- Lugs on side for mounting on skids or channels—Shaft extended and equipped with semi-flexible coupling to take 2⅝" drive shaft—Force feed lubrication. Automatic control. Includes 1" High capacity centrifugal circulating pump—"V" belt driven—18"x41" Air Receiver, 100 pounds working pressure. A.S.M.E. Standard. Electric or gasoline power required approximately 30 H.P., approximately 1000 R.P.M.—Compressor Speed approximately 550 R.P.M. — Overall dimensions: — Height 45"—Length 37½"—width 28". AC-3.

2 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressors with fittings. Brand New. AC-1.

1 11"x11"x12" STEAM DRIVEN LOCOMOTIVE TYPE, Westinghouse air compressor with fittings. Used. Make offer. AC-2.

ENGINES

Designed especially for application to Excavating or similar Equipment. Can be used for stationary or semi-stationary service.

Diesel

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—5-cylinder, 9" bore x 10½" stroke, 150 HP at 450 RPM, 4 cycle, Vertical—valve in head type. Dust proof, Oil tight crank case and forced lubricating system. Also auxiliary air starting equipment. DE-2.

4 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—3-cylinder 6" bore x 8" stroke, 45 H.P. at 650 R.P.M., 4-cycle, Vertical—valve-in-head type. DE-5.

2 BRAND NEW NON-REVERSIBLE ATLAS DIESEL ENGINES—4-cylinder, 6" bore x 8" stroke, 60 H.P. at 650 RPM. DE-6.

Gasoline

1 MODEL HH-U NOVO—16 H.P. ENGINE—4-cylinder, 3⅝" x 4"—1200 R.P.M.—Radiator cooled—complete power plant—mounted on channels—sheet metal housing—extended crank shaft 1⅞" diameter, including outboard bearing with Fafner ball bearing. GE-1.

1 MODEL D-3 WISCONSIN SIX CYLINDER 5½" x 6½" GASOLINE ENGINE—rated 121 H.P. at 1080 R.P.M. Complete with radiator, carburetors and accessories—Rebuilt—Like new. GE-2.

Steam

1 12½"x16" link reversing type for Railroad Shovel. ME-1.

2 4½" x 5" reversible — —20.8 HP at 400 RPM. 100 lb. Pressure. ME-2.

1 4¾"x5" reversible—23.2 H.P. at 400 RPM. 100 lb. Pressure. ME-3.

2 5"x5" reversible—25.6 H.P. at 400 R.P.M. 100 lb. Pressure. ME-4.

TRAILERS

1-14 TON WILLIAMS "ECONOMY" TRAILER. Arch Girder Construction—Safety Chains—Rear Loading ramp. Solid Rubber tired wheels 28"x10" front 28"x16" rear. Deck dimensions 12'x7'9"x31½" high. Brand new. T-1.

PUMPS

1 NB — 3 STAGE CENTRIFUGAL PUMP — 2" suction and discharge — bronze impeller and shaft—capacity 100 gallons per minute at 240' head operating at 1720 RPM or 270' head at 1780 RPM. Now equipped for belt drive but can be operated by 15 HP Electric Motor. ME-6.

Book Reviews

Diesel Engineering—"A practical book of instruction for engineers and students on modern Diesel engineering, land, marine, locomotive, aero, automotive and portable installation" is the way the newest edition of the Diesel Hand Book by Julius Rosbloom is characterized by the publishers, Diesel Engineering Institute, Jersey City, New Jersey. The book is an attractively bound volume of 352 pages. It is profusely illustrated and contains many tables and charts.

According to the foreword, this book was written and published "to clarify problems often encountered in Diesel service . . . the language used throughout is such that any person of limited education can understand . . . The operation of a Diesel engine should at no time be done by any person who lacks the knowledge of principles of this prime mover. While practice is an urgent requirement, however, it should be the duty of a Diesel engineer to acquaint himself with fundamentals and principles embodied in the characteristics of Oil engines. It is the trained operator who has studied theoretical phases and combines such knowledge with practice, who can analyze faults without difficulties."

The price is $5.00 prepaid and the book may be ordered direct from the Diesel Engineering Institute, 443 Hoboken Avenue, Jersey City, New Jersey or through Excavating Engineer.

Electrical Cable — A new 80-page reference book on "How to Select Insulated Cable" has been published by the **General Electric Company.** Designated as GEA-1837, the publication covers cable for the transmission and distribution of electric power at normal frequencies, and presents in convenient form the information that is required in determining the cable best adapted for a particular installation. The various types of insulation and finish are described, and tables of thickness are given. Tables of wire gauges and dimensions, sizes of shipping reels, and a bibliography are also included. A copy may be had by writing any General Electric Company office.

Jackbits—An 8-page, 2-color bulletin, No. 2012-C, recently issued by **Ingersoll-Rand,** 11 Broadway, New York City, describes jackbits. Six-point, four-point, and Carr bits are illustrated with both center-holes and side-holes. A large cross-sectional drawing shows the form of threads used on "Jackbits" and "Jackbit" rods. Tables of rod types and sizes are given, with dimensional drawings of the various shanks. The back page is devoted to illustrations and description of the electric or compressed air driven "Jackbit" grinders. A copy of this bulletin may be had by writing Ingersoll-Rand Co.

Bucyrus-Armstrong Blast Hole Drill Distributor in New Location

HARRY C. KAUFMAN, distributor of Bucyrus-Armstrong blast hole drills and tools in the states of California, Utah, Nevada, and Arizona, announces the opening of a new office, warehouse, and yard at 2020 Sacramento Street, Los Angeles, California; telephone—Trinity 3401. Mr. Kaufman carries a stock of complete drilling machines, and a full line of drill tools for blast hole, water well, oil well, and mine prospecting drills.

POSITIONS WANTED

Positions wanted advertisements will be run under this heading for 5 cents per word, minimum charge $1.00. Advertisements for help wanted free of charge.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

OPERATOR

Thirty years experience on coal stripping, railroad and highway construction. Prefer coal stripping anywhere. Can do own repair work and furnish best of references. Married. Present location, Pennsylvania. Box 6501.

SHOVEL OPERATOR

14 years' experience on railroad, highway and coal stripping. Prefer big coal stripper. Can do own erecting and repairing. Willing to go anywhere on short notice. Can furnish best of references. Present location Alabama. Box 6300.

EXPERT DRAGLINE AND SHOVEL OPERATOR

16 years' experience as shovel operator. Married, 36 years of age. Have operated practically all makes of machines, and have 10 years' experience as dragline operator. Can handle steam, Diesel, electric or gasoline machine. Have worked on highway and railroad grading, rock excavation in quarry, drainage and irrigation and dredging and also gold dredging. Prefer position on Bucyrus-Erie E-2, D-2, or 50-B or other Bucyrus-Erie machines. Have also operated Class 220 and 225 electric and Diesel electric machines. Capable of taking charge of repairing and erecting and can handle crews. Best of references and can do own repairing. At present located in California, but will go anywhere. Box 5507.

ENGINEER-SUPERINTENDENT WANTS CONNECTION WITH CONTRACTOR

Twenty years' exceptional experience in factory construction, rock work, roads, dams, tunnels, hydro-electric developments, foundations. Has produced results under difficult conditions and can handle large program in whole or part. Eight years Latin America. Go anywhere. Box 5102.

SUPERINTENDENT

20 years operating and in charge of heavy strip mine and quarry equipment. 45 years of age. Can furnish references from any former employer and the largest manufacturer of excavating equipment in America. Can take full charge on reasonable notice. Box 5901.

OPERATOR-QUARRY FOREMAN

Have 25 years experience operating steam, electric and gasoline shovels and draglines on all classes of work. Can do own repair work. Also experienced quarry foreman with very best references. Married but willing to go anywhere. Present location Kentucky. Box 6200.

EXPERIENCED DRAGLINE OPERATOR

Fifteen years' experience on Bucyrus-Monighan, P&H, Northwest and other makes of Steam, Diesel, gas and electric draglines on levee work and phosphate mines. Hold three sets civil service papers with ratings of 70%, 85%, and 100%. Married but can go anywhere. Furnish excellent references. Present location, Louisiana. Box 5905.

POSITION WANTED

College civil engineering student living in Milwaukee, Wisconsin, desires practical summer work with small pay on some small job such as shovel oiler, waterboy, flagman, rodman, or stakeboy for surveying, timekeeper, clerk, etc., preferably somewhere in Wisconsin. Two years' experience in surveying at college. Can furnish references. Box 6600.

JUNIOR ESTIMATOR: Having full knowledge of methods of securing Federal Building Contracts; six years experience with largest firm in this field. Desires connection offering advancement. Box 6800.

STEAM SHOVEL OPERATOR

14 years experience with steam machines only on Railroad and Highway grading, coal stripping, Rock Quarry and Gravel Pits. Can do own repair work, furnish references and willing to go anywhere. Present location, Tennessee. Box 6700.

GAS OR STEAM SHOVEL OPERATOR

7 years' experience on cutting slopes, gradings and highway construction, not afraid of work. Would like a position on any type of small machine anywhere in the U.S.A. Can do his own repair work and furnish good references. Box 6500.

Trade Notes

Effective July 1, 1934, T. M. Russell was made General Manager of the Tuttle Brick Company. Mr. Russell is Chairman of the Board of the Russell Manufacturing Company and Vice-President of the Central National Bank and Middletown Trust Company, both of Middletown, Connecticut. F. H. Holms was made Sales Manager. He has been associated with the F. H. Holmes Brick Company of New Britain for several years, and also associated with the brick association of Connecticut.

L. S. Stephens has been elected to succeed D. B. Piersen as president of the Stephens-Adamson Mfg. Co., conveyor manufacturers of Aurora, Illinois. Mr. Piersen, one of the founders of the firm in 1901, was made chairman of the board upon the resignation of W. W. Stephens of Pasadena, California. L. S. Stephens, the new president, has been active in the firm since 1914. In 1921 he was made superintendent and in 1926 vice president in charge of production. There are no other changes in the firm—R. C. Pierce of Los Angeles is vice president and western manager, F. G. Adamson, also of Los Angeles, is treasurer, C. H. Adamson secretary, M. A. Kendall chief engineer and C. A. Krause of Aurora is assistant treasurer.

FOR SALE

RATES:	First insertion rate per column inch	Repeat insertions (no change in copy) rate per column inch
Up to 3 inches	$4.50	$4.00
Over 3 and up to 7 inches	4.25	3.75
Over 7 inches	4.00	3.50

Rates are net (no commissions, no discounts) and payable in advance of publication. Send your remittance with insertion order and copy.

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards

ONE 18-B BUCYRUS-ERIE, ⅞-yard dipper on full revolving caterpillars. Box 182-SS.

BUCYRUS ERIE So. Milwaukee, Wis.

OFFERS FOR SALE OR RENT

FACTORY REBUILT and USED SHOVELS--CRANES--DRAGLINES

Please send me full details on:

- ☐ Monighan Dragline 60-foot boom. Priced right.
- ☐ Thew Model 35, ½ yd. Sh. Crane, S. Scoop & Trench Digger.
- ☐ General ½ yard Gas Shovel. A-1 condition. Bargain.
- ☐ Mead - Morrison Gasoline Combination Shovel-Clamshell. Good condition.
- ☐ P&H Model 207—40' Boom Dragline. Reconditioned.
- ☐ Bucyrus-Erie 43-B Chain Crowd Shovel. Rebuilt—Guaranteed.

Name.....

Address.....

BUCYRUS-ERIE B-2 HIGH LIFT STEAM SHOVEL—21'8" boom, 16' dipper handle, ⅞ yard dipper, power boom hoist, single shaft cat. Machine in excellent condition. Located Lapeer, Michigan. Will consider any reasonable offer. Box 524-SS.

THEW-LORAIN 75-A. 1¼ CU. YD. GASOLINE SHOVEL. Fair condition. Very favorable price. Located North Carolina. Box 553-SS.

BYERS BEAR CAT—⅝ yd. Gasoline Shovel—Recently overhauled—Located Birmingham, Alabama. Box 480-SS.

P & H MODEL 600—1 yd.—Gasoline Shovel—Waukesha Engine. Recently overhauled. Located in Alabama. Box 483-SS.

MARION MODEL 37 STEAM—OIL BURNING —SHOVEL. Cat mounted. 28'6" Boom, 20'6" Dipper Handle, 1¾ cu. yd. Dipper. Good operating condition. Located Minneapolis. Box 556-SS.

BYERS MODEL 40—⅝ cu. yd. Cable Crowd Shovel, Outside Dipper Handle, Plate Dipper. ¾ swing. Including Back Hoe Attachment. Hercules 4-cylinder Gasoline Engine. Cat mounted—12" treads. Located eastern Pennsylvania. Box 554-SS.

BUCYRUS-ERIE—42-B Steam Shovel, Caterpillar Mounted, 21' Boom, 15' Dipper Handle, 1½ Cubic Yard Dipper, Power Boom Hoist. This machine excellent mechanical condition. Located Birmingham, Alabama. Can be demonstrated. 531-SS.

2 BUCYRUS-ERIE—GA-2—Combination—45' Boom Clamshell—Crane machine and Extra High Lift Shovel equipment. Cat mounted—Self starter—All field rebuilt last year—Excellent condition—Located Eastern Pa. Box 485-SS.

Drag Shovel

Thew—Universal—Model 35—½-cu. yd. drag shovel complete. Center drive cat. Electric starter. 4 cylinder Waukesha 4½" x 6¼" gasoline engine. Also complete ½-yd. shovel equipment and 25' boom clamshell—crane equipment and bucket together with home-made trailer. Box 468-SS.

2 BYERS—MODEL 40—⅝ cu yd. Shovel, Cat Mounted ½ swing. Hercules 4"x4½" 4-cylinder Gasoline Engine. Make offer. Located near Boston. Box 555-SS.

2 BUCYRUS-ERIE B-2 Steam ⅞ yard High Lift Shovels—Cat mounted. Good operating condition. Located near Boston. Make offer. Box 521-SS.

BUCYRUS-ERIE STEAM COMBINATION ¾ yard shovel and 36' boom clamshell—Spur gear cat. Located near St. Louis. Box 520-SS.

GENERAL—½ CU. YD. Dipper, 13' Dipper handle, 16' Boom—Buda 4-cyl. 4½"x6" Gasoline Engine. Only handled about 75,000 cu. yd. material. A-1 operating condition. Located near Chicago. Box 526-SS.

MEAD-MORRISON COMBINATION SHOVEL-CLAMSHELL—½ cu. yd. Dipper, 17' Dipper Handle, 18' Boom—32' Boom Clamshell Equipment and ½ cu. yd. Erie Clamshell Bucket, Wisconsin 4-cyl. 5"x6" Gasoline Engine. Good operating condition. Located near Buffalo, New York. Box No. 527-SS.

BUCYRUS-ERIE GAS-AIR TYPE GA-2 HIGH LIFT SHOVEL—22'6" boom—16' dipper handle—1¼ yard cast front inserted tooth dipper—single shaft caterpillar mounting—electric starter. Excellent condition. Field reconditioned. Waukesha 4-cylinder 6¼"x8" engine—New cylinder blocks and piston rings. Located near Scranton, Pennsylvania. Will demonstrate. Box 508-SS.

Marion Type 32 Steam Shovel, Shop No. 5676, 18' boom, 15' dipper handle, 1¼-cu. yd. dipper shipped May, 1926, good operating condition. Box 451-SS.

BUCYRUS-ERIE 43-B GASOLINE CHAIN CROWD SHOVEL—23' boom—17' dipper handle—1½ cubic yard Vanderhoef dipper and teeth—electric starter—standard single shaft cat. Operated less than six months. Excellent appearance and condition. Will be demonstrated by owner. Located vicinity New York. No. 512-SS.

BRAND NEW PAGE DRAG SHOVEL EQUIPMENT suitable for application to Bucyrus-Erie 1030, 1035, or 32-B machines now in the field, consisting of 17-foot 1½-inch boom, 11-foot dipper handle, and two ¾ cubic-yard dippers; one 38-inches wide over cutters—the other 49½-inches wide over cutters, together with auxiliary A frame and ropes. Priced below cost. Box 381-SS.

FOR SALE:

BUCYRUS-ERIE "GA-2" Gas-Air Shovel, Shop No. 4441. Motor overhauled. New one cubic yard dipper installed. Excellent condition. Now working. Can be inspected on job. Also Locomotive Gas Crane. Shipping point — Rochester, Pa. Address: R. H. McKinley Co., Lincoln Hotel, Rochester, Pa.

BUCYRUS-ERIE FIELD RECONDITIONED D-2 Diesel High Lift Shovel—26' Boom, 17' Dipper Handle, 1 cubic yard Dipper, Atlas four-cylinder 6½"x8½" Engine. Excellent condition. Box 428-SS.

P&H MODEL 208—45' Boom Dragline—100 HP Waukesha Gas High Altitude Engine. Good operating condition. Box 432-SS.

P&H MODEL 207—40' Boom Dragline—Buda Gas Engine. Field reconditioned. Box 433-SS.

Type "B" Caterpillar mounted, equipped with 19'6" boom, 16' dipper stick and ¾ yard dipper, in good working order. Located near Hudson, Pennsylvania. Price $1750.00. Box 493-SS.

20-B BUCYRUS-ERIE STEAM SHOVEL, serial number 4000; caterpillar mounted; 18-foot boom, 12-foot 6-inch dipper handle, 1-yard dipper; shipped new in 1923; located western Missouri. Bargain. Box 241-SS.

OSGOOD MODEL 18 Steam—¾ yard shovel—Cat mounted. Just completely overhauled. Excellent condition. Located near Indianapolis, Ind. Box 522-SS.

BUCYRUS-ERIE GA-2 Gas-Air—Extra high lift 24' boom—18' 4" dipper handle, 1 cu. yd. dipper. Single shaft cat mounting—air starter. Good condition, Located near Hartford, Conn. Box 523-SS.

BUCYRUS-ERIE—MODEL 1025—⅝ yd. Gasoline Shovel. Good condition. Located in California. Box 479-SS.

BUCYRUS-ERIE GA-2—Gas-Air Combination High Lift Shovel and 50' Boom Dragline Equipment, mounted on Single Shaft Cat. Good operating condition. Located near Baton Rouge, Louisiana. 537-SS.

BUCYRUS-ERIE B-2—Late Model High Lift, Single Shaft Cat Mounted, Steam Shovel. Excellent condition. Located vicinity Boston. To be demonstrated. 538-SS.

FOR SALE

Address all box numbers c/o Excavating Engineer at South Milwaukee, Wisconsin

Small Shovels
Under 2 Yards
Continued

BUCYRUS-ERIE 35-B ELECTRIC 24' BOOM, 16' Dipper Handle, ½ cu. yd. Dipper, 3 phase, 25 cycle, 440 volt, Cat mounted. Box 544-SS.

BAY CITY ½ CU. YD. GASOLINE CAT MOUNTED SHOVEL. Good condition. Located Massachusetts. Low price. Box 550-SS.

NORTHWEST MODEL 6-1-½ CU. YD. SHOVEL—22' Boom, 19' Dipper Handle, Caterpillar Diesel Model D-11000 6-cyl. Engine. Rebuilt early this year. Excellent condition. Located eastern Pennsylvania. Box 547-SS.

P&H MODEL 300 COMBINATION ⅜ yard shovel and 35' Boom Clamshell Machine. Cat mounted. Gasoline Power. Located Connecticut. Box 551-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' Boom, 15' Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, Cat mounted. Located New York City. Box 545-SS.

KOEHRING MODEL 501 SHOVEL—24' Boom, 16' Dipper Handle, 1¼ cu. yd. Dipper, Cable Crowd. 4-cyl. Wisconsin Gasoline Engine. Electric Starter. Automatic Trip. Chain Drive Cat. Excellent condition. Located near New York City. Box 552-SS.

LIMA 101 GASOLINE COMBINATION—1¼ cu. yd. Shovel and 40' plus 10 Extension Dragline. Model JK 6½"x7" 4-cylinder Engine. Cat mounted. Good condition. Will rent. Located Colorado. Box 548-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL—21' Boom 15' Dipper Handle, 1¼ cu. yd. Dipper, Power Boom Hoist, ASME Boiler. Good condition. Located central New York state. Priced very low. Box 546-SS.

KOEHRING MODEL 1 Gas 30' Boom Crane—4½"x5" Wisconsin Engine. Box 435-SS.

BAY CITY MODEL K GASOLINE SHOVEL—17' boom, 11' Dipper Handle, ½ cubic yard Dipper, 50 HP Hercules Gasoline Engine. Machine rebuilt in 1932 and equipped with positive "Snap In" type propelling clutches and other features of Model K-2 type. Located central New York. Priced for quick sale. Box 513-SS.

BUCYRUS-ERIE LATE MODEL B-2 STEAM HIGH LIFT SHOVEL. 1 yard dipper—single shaft cat mounting. Good condition. Located near St. Louis. Box 518-SS.

BUCYRUS-ERIE 41-B STEAM SHOVEL: 21' boom, 15' dipper handle, boom hoist, dipper trip, 1¼ cu. yd. Vanderhoef dipper, cat mounting, now located and can be demonstrated at Colchester, Conn. Very favorable price. Box No. 532-SS

BUCYRUS-ERIE 42-B STEAM SHOVEL—late model. 21' boom, 15' dipper handle, 1½ cu. yd. Vanderhoef dipper, boom hoist, dipper trip. Massachusetts standard boiler, cat mounting. Good operating condition. Now located and can be demonstrated at Colchester, Conn. Box No. 533-SS

MARION MODEL 450—1¼ Cu. Yd. Steam Shovel, Cat Mounted. New Gears on Caterpillar recently installed. Price favorable. 536-SS.

BUCYRUS-ERIE MODEL 1035—Gasoline, Chain Crowd Shovel, Single Shaft Cat, 26" Treads, Electric Starter, ⅞ Cu. Yd. Dipper. Now operating. Can be demonstrated. Located Massachusetts. 535-SS.

BUCYRUS-ERIE TYPE B STEAM COMBINATION SHOVEL-CLAMSHELL AND STEAM HOE. Machine completely rebuilt 1929. Good operating condition. Located near Boston. Box 517-SS.

NORTHWEST MODEL 6—1½-YARD SHOVEL, Twin City 4-cylinder 7¼"x9" engine. Close Crowd. New 1931. Located near Philadelphia. Box No. 503-SS.

BUCYRUS-ERIE 1030 GAS, ROPE CROWD SHOVEL. Good operating condition. Located eastern Minnesota. Available for demonstration. Price right for quick sale. Box No. 490-SS.

BUCYRUS-ERIE 37-B Gas, Chain Crowd Shovel—23' boom, 17' dipper handle, 1¼ cubic yard inserted tooth dipper, electric starter, standard single shaft cat mounting. Now at factory undergoing extensive repairs. Excellent mechanical condition. No. 511-SS.

AUSTIN-BADGER TRACTOR SHOVEL—15' Boom, 11' Dipper Handle, 11 cubic feet Plate Dipper, Cat mounted. McCormick Deering 4-cylinder 4¼"x5" Gasoline Engine. Excellent condition except minor repairs. Trailer included. Located western New York state. Very reasonable price. Box 549-SS.

BUCYRUS-ERIE MODEL 1025 GASOLINE COMBINATION ⅝-YARD SHOVEL — 35' Clamshell, including ¾-yard Williams Clamshell Bucket. Located near Oshkosh, Wisconsin. Good condition. Box No. 504-SS.

HEAVY DUTY OSGOOD SHOVEL, Shop No. between 1600 and 1700, located near Scranton, Pa., equipped with a 1½ cubic yard dipper, in good operating condition. Price $3000.00. Boiler inspected January 1st, 1934. Box 473-SS.

BUCYRUS-ERIE GA-2 SHOVEL—22'6" Boom, 16' Dipper Handle, 1 yard Dipper, Waukesha 6¼"x8" 4-cylinder Engine. Cat mounted. Recently field reconditioned. Excellent condition. Located Louisville, Kentucky. Box 542-SS.

BUCYRUS-ERIE GA-2 SHOVEL—24 BOOM, 16' DIPPER HANDLE, 1¼ CU. YD. DIPPER. Battery Lighting System. Late style Cat mounting. Excellent condition. Located West Virginia. Favorable price. Box 541-SS.

TWO (2) MODEL 301 STANDARD KOEHRING MACHINES, good operating condition. Now operating and can be inspected in southwestern Ohio. Price, $3,000.00 each. Box 540-SS.

Small Draglines
Under 2 Yards

BUCYRUS-ERIE D-2--Atlas Diesel—45' boom dragline and 1 cu. yd. Page bucket. Cat mounted. Good operating condition. Located near Marianna, Ark. Very attractive price. Box 450-SD.

P & H MODEL 700 DRAGLINE: number 2894, equipped with a 50 foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with 4-cylinder Atlas Diesel engine. Box 189-SD.

P & H DRAGLINE MODEL 700: number 2456 equipped with a 50-foot boom, light 1½-cubic-yard drag bucket, electric light plant, and powered with a Waukesha gasoline engine. Box 190-SD.

MONIGHAN 60 FOOT BOOM DRAGLINE mounted on 1-W walking device—Waukesha 5¾x8, 4 cyl. gas engine, also 1¼ yd. Page bucket. Good operating condition. Box 408-SD.

P & H Model 206 B Dragline. Good operating condition. Very favorably priced. Box 390-SD.

P&H MODEL 775—70' BOOM DRAGLINE including 1½ and 2 yard Omaha Buckets. Extra long Crawler. Excellent mechanical condition. No repairs needed. Located near Memphis. Box No. 489-SD.

2 NORTHWEST MODEL 104 Gasoline 40' Boom Draglines. Box 515-SD.

BUCYRUS-ERIE 30-B Diesel 40' Boom Dragline. Box 437SD.

P&H MODEL 208—45' BOOM DRAGLINE— 7¾"x9" four cylinder Twin City Gas Engine, 1¼ cu. yd. Omaha Bucket included. Box 460-SD.

NORTHWEST—MODEL No. 4—50' boom dragline including drop ball for rock breaking. Cat mounted. 4 cylinder 6 x 7 Wisconsin gasoline engine. Excellent operating condition. Located vicinity New York. Box 470-SD.

MONIGHAN BRAND NEW—40' Boom Dragline. Cat mounted, Waukesha four-cylinder 6¼"x7" Gasoline Engine, 900 R.P.M., 93 H.P. Electric Starter, Steel Cab. Exceptional Value. Box 453-SD.

Small Clamshells and Cranes
Under 2 Yards

BUCYRUS-ERIE 1030 GASOLINE 40' BOOM CLAMSHELL MACHINE. Cat mounted. No Bucket. Recently overhauled. Guaranteed. Located Kansas City. Box 543-SCC.

NORTHWEST MODEL 105 Gasoline—40' boom clamshell. Good operating condition. Located Iowa. Box 516-SCC.

BAY CITY "PUP" CLAMSHELL MACHINE. Good operating condition. Box 514-SCC.

THEW-UNIVERSAL 35 CRANE on center drive cats, 36' Boom, fairleads, ½ yd. dragline bucket, 3000 lb. hammer, leads and cap. Excellent condition, sale or rent. Located Western Ohio. Box 457-SCC.

McMYLER MODEL J. LOCOMOTIVE CRANE—35 Ton Steam. 50 and 75-ft. Boom. 2-yd. bucket. New boiler and swinging engine recently installed. A real crane for long reach and heavy work. Thoroughly overhauled condition. Price on application.
Box 346-SCC.

BYERS BEARCAT 25' BOOM CLAMSHELL. (⅓ swing) and ½ cu. yd. Clamshell Bucket, including Trench digging attachment carrying ½ cu. yd. dipper. 24" wide over cutters—will dig maximum 15'. Good operating condition. Very attractively priced. Located vicinity of Wilkes Barre, Pennsylvania. Box 494-SCC.

CRANE—THEW—UNIVERSAL—MODEL 35 — 25' boom clamshell—crane including ½ cu. yd. Williams clamshell bucket—center drive cat. Electric starter, 4 cylinder Waukesha 4½"x6¼" gasoline engine. Also, complete ½ yd. shovel equipment, drag shovel equipment and skimmer scoop equipment together with home-made trailer. Box 468-SCC.

NORTHWEST — MODEL 105 — 45' BOOM CRANE. Cat mounted. 1 yd. capacity. 6¼x8 Twin City gasoline engine. Good operating condition. Located vicinity New York. Box 469-SCC.

Large Shovels and Draglines
2 Yards and Over

FOR SALE

CLASS 14 STEAM DRAGLINE with 2-yard Page bucket. Location Iowa. Very good condition. Surprisingly low price f.o.b. cars.

ALSO

2-YARD MONIGHAN STEAM DRAGLINE in fair condition—cheap. Box 419-LSD.

70-TON STEAM SHOVEL mounted on "cats." caterpillars in good condition. Located near Hazelton, Pa. Box 162-LSD.

50-B BUCYRUS-ERIE ELECTRIC CRANE with 75 ft. boom. Can be inspected in operation. Not far from Kansas City. Box 474-LSD.

225-B SHOVEL, 6 and 7-yard dipper with caterpillars and track type equipment—in first-class condition. Located in northern Missouri. Box 452-LSD.

85-C STEAM SHOVEL, on caterpillar mounting, caterpillars in good condition, price $2,500. Located near Hazelton, Pa. Box 163-LSD.

50-B STEAM SHOVEL, Number 3946; equipped with 1½-cubic-yard dipper, 26-foot boom, also 1½-cubic-yard dragline bucket with 50-foot boom caterpillar mounted, equipped for burning oil, located at Texarkana, Ark. Price very reasonable. Box 112-LSD.

50-B DIESEL SHOVEL AND DRAGLINE, mid-western location. Machine now working but can be had for a price which is reasonable. Box 501-LSD.